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EDITORIALS

NEW RECORD REACHED IN ELECTRICAL EXPORTS.

For the third time this year the monthly total of the electrical exports has broken all previous records. The latest official figures available, as shown in another part of this issue, disclose that in August the aggregate value of the electrical shipments abroad was nearly $3,600,000, or about $160,000 greater than the record of last May. A still more striking result is shown on comparison of the totals of last August and of the corresponding month a year ago. The latter was only about one-half of the newly established high mark.

A comparison of the electrical totals for the first eight months of the present year with the corresponding periods of 1915 and 1914 shows the following figures respectively: $23,528,623, $14,976,659, and $13,654,569. A more decisive proof of the growth of the electrical export business during the last eight months or so can not be desired.

On analyzing the details of this tremendous growth one notes an extraordinary increase in the miscellaneous electrical shipments, which are lumped in the government reports as "all other." For instance, last August these amounted to nearly one-half of the entire electrical total or three times as much as in August last year. In the first eight months of the present year they aggregated nearly twice as much in value as in the corresponding periods of 1915 and 1914. The desirability of some further segregation of this miscellaneous group is obvious.

Although a considerable portion of this increased value of electrical exports is probably due to higher prices of copper and other raw materials entering into electrical manufactures, the exact influence thereof on foreign shipments can not be stated. In the case of only one of the four classes for which numbers of articles are reported, namely electric fans, is it likely that the sizes and types of articles have not greatly changed. Singularly enough, however, the average value of each fan exported has not radically changed during the last four years.

At any rate, the indications are that a real and valuable increase has occurred in this branch of the electrical business and that the efforts of our electrical manufacturers to demonstrate their ability to meet foreign demands have borne fruit. How permanent this growth in electrical exports will be is manifestly conjectural. The reputation now established by the quality of American electrical goods and the service rendered by our exporters is likely to have an important bearing on this question.

TRADE AFTER THE WAR.

In spite of the enormous present volume of exports from this country, grave fears are expressed in many quarters that this volume will not only fall back to the pre-war level, but that measures will be introduced by the present belligerents to restrict the commerce of both present enemies and neutral countries to the lowest possible value. The English periodicals are full of talk of the commercial "war after the war," and advocates of all kinds of restrictive measures are numerous.

It is of course to be expected that so much of our present trade as has been occasioned by the European war will largely fall off after the war's cessation. This trade is of two classes: direct supplies to belligerent countries, and supplies to other countries whose previous trade has been interfered with by the war. Of the latter, a portion at least should be retained by this country when normal conditions have been restored. The European powers are said to be contemplating measures, however, which will discriminate so strongly against enemy and neutral commerce as to greatly hamper the latter. At the economic conference of the Allies held in Paris last June proposals were adopted for after-war trade which were at first assumed to have the purpose of discriminating against American trade. The fallacy of this interpretation was soon generally recognized and recent statements of responsible publicists have shown that such was not the intention.

In an interview last month Lord Robert Cecil, British Minister of War Trade, said: "Our relations with the New World will always be of vast importance to us and they take a leading place in our plans." Measures taken during hostilities to prevent trade were explained as war measures and it was stated that the British Government has no plans for trade after the war which contemplate stifling the commercial enterprise of neutral nations. Viscount Bryce, in an address at Birmingham last month, uttered a warning against the adoption of any measures which would tend to start a war of trade to follow the war of arms. Men of this type recognize that reciprocal trade relations are beneficial to both parties involved, and that it is an economic blunder to attempt to cripple normal trade even with present enemies.

In Germany there have been similar rumors of trade agreements and discriminations after the war. And similar indications have been given there that the leading men are too wise to restrict trade to such narrow channels as to hamper their own development.

Germany is too dependent upon the United States for certain articles, and this country can supply itself in some ways with too much advantage from Germany to permit of the permanent interruption of natural and mutually advantageous trade relations. The same is true of England. We may be sure that with the sober thought which will accompany the reconstruction period following the bitterness of war there will be no deliberate discrimination against American goods by either group of belligerents, although there is likelihood of reciprocal agreements which will especially encourage trade between particular countries which are now allies.

THE ORGANIZATION OF INDUSTRY.

In his address at the annual Steinmetz meeting of the Chicago electrical societies last week, Dr. Charles P. Steinmetz pointed out the difference between the individualistic and the co-operative methods in industry and their effect both internally and upon the foreign relations of the nation. England and Germany, the two greatest industrial nations of Europe (perhaps because they are the best supplied with coal, the principal source of power) represent the most extreme examples of the two types. The United States has largely followed England's ideals and methods of the freest competition.

The enormous productivity of industry resulting from modern invention of labor-saving devices serves to flood the market with more products than are needed for consumption under modern social and industrial conditions, Dr. Steinmetz said. The last qualifying clause is significant. With plenty of poverty and want among us, with large demands made upon relief organizations, with able-bodied men seeking employment, there is still in normal times insufficient purchasing power to absorb the possible output of our factories. One solution of the difficulty is a method of distribution of labor products which will permit greater consumption by those who produce. The other is organized control of production and markets, which prevents competitive price-cutting, demoralization and bankruptcy. German industries have practiced the latter scheme under the patronage of their government. In this country such co-operation has been made illegal by our anti-trust laws and what has been accomplished has been done surreptitiously.

War conditions have brought about a desire for similar organization in England, and Dr. Steinmetz believes that conditions there will be vastly changed after the war. Similar unification of industry here, with the elimination of the small concern, and the substitution of the efficiency and economy resulting from large-scale production, will be necessary, he thinks, if we are to hold our own as an industrial nation. But here a question may be raised. Do efficiency and economy increase with the concentration of management in few hands? Experience answers, in some instances, yes; in others, no. On every hand we see small concerns holding their own, where competition is fair and the unjust advantages of railroad rebates and other discriminations are not involved. Competition stimulates efficiency. Monoply conditions stimulate carelessness and extravagance. It is often claimed that the Post Office Department, the greatest monopoly in the country, is inefficiently managed. One of the commonest arguments against a socialistic regime is the lack of incentive to efficiency, to invention and to betterment without the stimulative force of competition and individual achievement. Yet we must admit that Germany, the most socialistic nation of our time, has demonstrated the greatest efficiency both in industry and in organization for national purposes. But perhaps it is possible to get the same co-operation without the forms of socialism. That remains to be seen. If obtainable anywhere, it should be capable of demonstration in the electrical industry of this country, where we have had co-operation preached so long and so persistently.

ENFORCING THE CODE.

In a certain number of municipalities electrical codes of local origin have been adopted, in some cases increasing the rigidity of the provisions of the National Electrical Code and in others merely substituting an independent set of rules. In the larger part of this country, however, the National Electrical Code is the standard for wiring practice either through adoption by municipalities or through the activities of underwriters' associations.

Whatever the form of code may be or by whomever it may be enforced, it should be borne in mind that the ultimate object is to secure the best possible electrical construction and that this can be accomplished best by the co-operation of the different parties concerned and by the diffusion of as much knowledge as possible on the matters at issue. It is the duty of inspectors consequently not only to see that the rules are enforced, but to act to a certain extent as instructors in this subject, showing why the rules are desirable and how their application will reduce hazards to life and property. When an inspector approaches his task with tact and courtesy and shows why a ruling is desirable and how it reduces a hazard, he is in a better position to secure the co-operation of the other parties interested and to obviate the necessity of his own activities in future cases. The inspector should not only secure good construction, but he should as far as possible inculcate the desire upon the part of owners and contractors to install such construction for its own sake.

The procedure here advocated will have the additional advantage of making the inspector continually analyze the reasons which lie behind the Code rules, and consider whether those rules are the best which can be formulated to cover the subject. It is through such searching examination by the men in the field that the Code may be amended and improved. The National Electrical Code is not an inflexible and permanent body of laws which has been handed down as the dispensation of some superhuman authority; on the contrary it represents the gradual crystallization of the

accumulated experience of those, underwriters and electrical men especially, who have been in close contact with the industry and its development. It is not a completed thing, but one still in the making. The daily experience of those in close contact with installation work, whether as inspectors, contractors, or engineers, should offer suggestions for its improvement.

The next revision of the National Electrical Code will take place in March, 1917. That time is not far distant. Suggestions for additions to, or changes in, the Code should be formulated at once and sent to the secretary of the Electrical Committee of the National Fire Protection Association, under whose auspices the Code is revised and published. It should be noted, however, that such suggestions should be specific, and not consist of mere objections to present rules. It is seldom that the best result is obtained by deleting a rule in its entirety; usually a different wording or a change in some specific requirement is required; or it may be that an entirely new rule is needed. In any case suggestions for revision should suggest a definite wording to replace the present rule. Such suggestions should be sent in only after consultation with others and after criticism from every possible angle. Discussion of a proposed change by some local body of inspectors or contractors is always desirable, and often this procedure will obviate proposals which are ill considered, and whose originators have not discussed every aspect of the subject. The Electrical Committee has a large work on its hands and should not be embarrassed by a multiplicity of proposals which even a superficial examination may show to be lacking in the essential requirements for a Code rule of universal application.

ELECTRICS FOR WINTER WEATHER.

The near approach of the winter season should stimulate both central stations and manufacturers of electric vehicles to an active campaign for the extension of use of the electric truck. The advent of snow, with slippery streets, ice-covered hills and general bad weather, always ushers in also a long list of troubles with horse-drawn vehicles and resultant interruptions to delivery service. These troubles and interruptions are not only irritating but expensive and many a horse falls on an icy street never to rise again. It requires only a satisfactory demonstration that the electric truck can successfully operate under such conditions and maintain its schedule of deliveries under all variations of the weather to clinch many a contract for service and order for equipment.

Put these thoughts before the manager of the delivery service now so that he may have had time to fully investigate the matter before a crisis requiring emergency action arises. When that crisis comes, even though immediate arrangements of another sort are made, he will have in the background of his plans the provision of the electric truck for ultimate service. And if the electric can be put into immediate operation, so much the better.

THE MINIMUM CHARGE.

Every electrical engineer and manager of a central-station company realizes the fairness of a minimum charge for supplying electric service, or in fact any other kind of utility service. The practice of making such a charge is widespread although there are many utilities which have not yet applied it in their local territory. It is universally recognized that there are elements of cost in furnishing utility service which are not proportional to the amount of electrical energy, water, gas, etc., used by the consumer, and which in fact represent expense which is incurred just as certainly during periods when no service at all is required. In some instances reimbursement for such expenses is provided by a readiness-to-serve charge or a customer charge which is independent of the charge made for electrical energy or other commodity supplied by the utility. The minimum charge differs from these charges in that it pays for a certain amount of the commodity as well. If the above charges are justified, certainly the minimum charge is also justified in principle and the only question in its application can be as to the amount of this charge. The fairness of such a charge cannot successfully be attacked.

Among the public, however, who are not familiar with the elements of cost in utility service, the fairness of such a charge has frequently been disputed. The idea underlying this attitude is that the customer should pay only for commodities received or service actually rendered, and it is not always recognized that readiness to serve is in itself a service. Where commissions and courts have found it necessary to pass upon this question they have very generally upheld the fairness of a minimum charge. Such decisions have been made by the supreme courts of Kansas, Missouri, New York and Tennessee. In Arizona the Legislature provided by statute that gas, electricity and water should be charged for according to the amount used and that no other charge should be made. Even in spite of this legislative enactment the Corporation Commission of the state put in effect a minimum charge and this was upheld by the Supreme Court of the state, which decided that the statute affecting the matter was void.

There are also a number of precedents for the establishment of a minimum charge which varies with the maximum demand of the consumer as represented by the size of his meter. This has been applied especially in connection with utilities supplying water, but the principle would apply equally well to electric utility service. It is not, however, customary to make such a distinction in applying the minimum charge to electric service.

A summary of court and commission decisions and of established rates of this character has been collected by Mr. Samuel S. Wyer and has been published in a booklet which is referred to this week in the department dealing with Current Electrical News. It will no doubt be found useful by officials of electric utilities who are called upon to satisfy their patrons of the reasonableness of the minimum charge.

Happenings in the Industry

Change in Ownership of Federal Light & Traction—Southeastern Convention Program—Record Electrical Exports for August—Dr. Steinmetz Discusses Effect of War on American Industries—Activities of Lighting Sales Bureau of Commercial Section—Magnet-Wire Manufacturers to Organize—Toledo Jovians Plan Show

WESTINGHOUSE COMPANY WITH SAMUEL INSULL ACQUIRE SUBSTANTIAL HOLDINGS IN FEDERAL LIGHT & TRACTION COMPANY.

Change in Board of Directors of Syndicate Controlling Twenty Properties a Significant Development in the Public Utility Field.

Westinghouse Electric & Manufacturing Company interests and Samuel Insull, of Chicago, president of the Commonwealth Edison Company, have acquired substantial holdings in the stock and other securities of the Federal Light & Traction Company.

This transaction has resulted in changing the affiliations of Federal Light & Traction from the General Electric Company to Westinghouse Electric. At a special meeting of the directors of the Traction Company, Anson W. Burchard, vice-president of the General Electric Company, Harrison Williams, F. L. Dame and R. E. Breed resigned from the Board and Guy E. Tripp, chairman of Westinghouse Electric, Calvert Townley and Samuel Insull were elected directors, leaving one vacancy to be filled.

Mr. Breed, one of the retiring directors, is president of the American Gas & Electric Company, with which the name of General Electric has been associated; while Mr. Dame is associated with Harrison Williams who is closely connected with the public utility enterprises of the General Electric Company.

Samuel Insull is generally regarded as the most prominent figure in the public utility field, and Mr. Townley, another of the new directors, is associated with the Westinghouse interests.

Federal Light & Traction has a controlling interest in 20 light, power, traction and water companies. It has $2,500,000 six per cent preferred stock outstanding and $4,750,000 common stock outstanding out of $5,500,000 of each class of stock authorized.

Acquisition of this interest in the Federal company makes Westinghouse Electric an important factor in the public-utility field. Heretofore its activity in that direction has been limited, although it owns the Electric Properties Company, having within the past year secured the interest of Stone & Webster in that concern.

Southeastern Section, N. E. L. A., to Hold Convention in November.

A very interesting program has been prepared for the annual meeting of the Southeastern Section, National Electric Light Association, which will be held at Tampa, Fla., November 15-17. It will be the fourth meeting of the organization since its expansion from the Georgia Section to take in five other Southern states.

The following papers have been listed: "The Maintenance of Central-Station Electrical Instruments," by F. M. Farmer, chief engineer of the Electrical Testing Laboratories, New York City; "Advertising Electricity—Its Service and Applications," by J. C. McQuiston, advertising manager of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; "Accounting, an Essential of Management," by F. G. Whitney, auditor of the Southern Utilities Company, Jacksonville, Fla.; "General Store and Window Lighting," by F. E. Lauderbach and Norman B. Hickox, of the National X-Ray Reflector Company, Chicago, Ill.; "The Conservation and Direction of Human Energy," by J. H. Finney, general manager of the Aluminium Company of America, Washington, D. C.; "The Heating Device Load," by Frank Hammond, of the Birmingham (Ala.) Light & Power Company; "Up-to-Date Developments in Steam-Turbine Designs," by M. B. Carroll, of the General Electric Company, Lynn, Mass.; "Everyday Problems of Municipal Ownership," by Arthur Williams, of the New York Edison Company; "Notes on Grounding of Secondaries and Lightning Arresters," by E. P. Peck, superintendent of tests and repairs of the Georgia Railway & Power Company, Atlanta, Ga.; "The Future Street Lamp," by W. P. Hurley, of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Secretary T. C. Martin and one or two other officers of the National Electric Light Association are expected to be present at this meeting.

Electrical Exports for August Establish Another New Record.

A new record for electrical exports is disclosed in the total for August just made public in the summary of the foreign commerce of the United States for that month, issued by the Bureau of Foreign and Domestic Commerce, Washington, D. C. Last August's electrical total exceeds by over four per cent the former record of last May. It is almost twice the total of August of last year.

The numbers of articles shipped are given in the report for only four electrical classes, which, during last August, were as follows: Electric fans, 2,485; arc lamps, 157; carbon-filament lamps, 33,958; metal-filament lamps, 673,029.

The detailed figures of the August electrical exports are given in the following table:

Articles	August, 1916	August, 1915
Batteries	$ 161,513	$ 114,516
Dynamos or generators	216,626	216,905
Fans	34,333	15,453
Insulated wires and cables	406,526	251,083
Interior wiring supplies, etc. (including fixtures)	80,707	49,202
Lamps—		
Arc	1,672	1,633
Carbon-filament	3,747	17,221
Metal-filament	107,571	74,119
Meters and other measuring instruments	89,579	57,244
Motors	402,489	277,940
Telegraph instruments (including wireless apparatus)	25,488	17,630
Telephones	124,234	50,841
Transformers	107,619	29,146
All other	1,833,631	633,958
Total	$3,595,735	$1,806,292

Farley Osgood Lectures Before Lynn Section.

On October 25 Farley Osgood, manager of the Public Service Company of New Jersey, lectured on "The Human Side of Engineering" before the Lynn Section, American Institute of Electrical Engineers. Among other things the speaker said that the men in the field appreciate it when the men in the factories help them. The fellow who designs motors, and perhaps sits up all night to perfect his design, should also think of the fellows in the operating business who may sit up many a night as long as the motor is used.

Dr. Steinmetz Discusses the Effect of the European War Upon American Industries.

At a joint meeting held in Chicago on October 25 by the Chicago Section, the American Institute of Electrical Engineers, and the Electrical Section, Western Society of Engineers, Charles P. Steinmetz gave a talk on "The Effect of the European War Upon American Industries." In opening, he traced the progress of civilization through various eras, showing that the American and French Revolutions by their declarations of the rights of man ushered in the present industrial era. The resulting development of individual initiative led to the great inventions of the past century, all of which through their labor-saving characteristics made men and nations capable of producing more than they consumed. As soon as this point was reached it was a problem either of reducing production, and thereby facing bankruptcy, or of finding new markets.

England was the first distinctively industrial nation. It found markets for its surplus goods abroad and the income from its foreign trade was largely invested abroad, making it the leading financial power of the world. Germany developed industrially with great rapidity and also found markets abroad, its surplus capital being invested in foreign fields at very low rates, because it was not required at home. England is the most individualistic nation and Germany the most co-operative one. The latter's industrial development is due in large degree to the extremely high economy obtained by mass production, embodying the most advanced scientific methods and governmental policies to promote industry and commerce. The result is shown in the extraordinary efficiency with which Germany is conducting the present war against very heavy odds.

This war will leave an entirely different Europe. Already England and France are adopting Germany's methods to promote industrial efficiency and economy. When war is concluded a most profound change will take place in all international trade. Regardless of any temporary checks due to protective tariffs, those countries will dominate foreign commerce that will be able to produce commodities in the most economical manner. America must awaken to the necessity of developing all its industries to the highest state of efficiency and maximum economy. This involves production on a large scale and complete control of production and prices, so as to avoid flooding the markets. This means giving extraordinary power to those controlling the industries. To prevent abuse of this power either governmental restrictions may be necessary or better yet such an organization of industries as will make it financially inexpedient to abuse power. It also will require a thorough co-operation between all elements in an industry, i. e., fully as complete harmony between the management and the shop employees as now almost invariably exists between the management and the office employees.

Activities of the Lighting Sales Bureau of the National Electric Light Association.

Considerable progress is being made by the Lighting Sales Bureau of the Commercial Section, N. E. L. A., looking not only to the preparation of valuable reports to be presented at the next annual meeting of the Association but also to the collection and dissemination of data for the benefit of sales departments.

The bureau held its first meeting at Cleveland on September 1, 1916, and it intends holding its second meeting in New York on November 24 and an additional meeting will be held the latter part of February.

The sub-committees of the Bureau and their respective chairmen are as follows: Committee on Residence Lighting, W. R. Moulton, chairman; Committee on Electrical Advertising, C. S. Buller, chairman; Store-Lighting Committee, S. B. Burrows, chairman; Public Building Lighting Committee, E. C. Kimball, chairman; Committee on Commercial Aspects of Street and Highway Lighting, A. W. Young, chairman; Industrial Lighting Committee, J. J. Kirk, chairman; Outdoor Lighting Committee, C. L. Law, chairman; Commercial Aspects of Lamp Equipment, O. R. Hogue, chairman.

The first meeting of each sub-committee will be held previous to November 24, 1916, and the chairmen of the various sub-committees have been advised that their reports have to be in the hands of Chairman E. A. Edkins of the Commercial Section, by March 1, 1917, so that their reports will be printed and in the hands of the Commercial members of the N. E. L. A. previous to the 1917 convention of the Association.

With the idea in mind that the work of this Bureau is something more than to prepare reports for presentation at the annual convention, the Lighting Sales Bureau will render assistance to all member companies and furnish at all times information pertaining to campaigns and practices of other member companies on work covered by this Bureau. Requests of this nature should be sent to the Lighting Sales Bureau, Commercial Section, National Electric Light Association, 29 West Thirty-Ninth Street, New York, N. Y.

The Lighting Sales Bureau is planning to have a very interesting program for its portion of the Commercial Section session at the next annual convention and in addition is making arrangements for an address on salesmanship at the next annual dinner of the Lighting Sales Bureau that will be held during convention week.

Thomas F. Kelly, of Dayton, O., is chairman of the Executive Committee of the Bureau.

Organization Meeting of Manufacturers of Magnet Wire.

In accordance with the invitation issued by the general secretary of the Associated Manufacturers of Electrical Supplies, the manufacturers of magnet wire held a meeting on October 19, 1916, at the Hotel Biltmore, New York, at 10:00 a. m. The principal purpose of this meeting was to determine whether the magnet-wire manufacturers would organize as an independent section of the Association, under the name of the Magnet Wire Section, or as a Magnet Wire Committee of the present Wire and Cable Section.

B. S. Webb, of the New England Electrical Works, was elected chairman, and Edwin B. Bartram, of Alfred Moore, secretary. Thomas M. Debevoise, counsel of the Association, addressed the meeting, outlining the purpose of the Association and the work to be accomplished, and making a number of valuable suggestions along legal lines relative to the work of the Sections.

Charles E. Dustin, general secretary of the Association, explained in detail the aims and activities of the Associated Manufacturers of Electrical Supplies for the benefit of those present not already members, and of the many lines of activities already taken up in many of the Sections, which have thus far given most gratifying results.

After a general discussion, on putting the vote to the meeting, it was unanimously decided to organize as the Magnet Wire Committee of the Wire and Cable Section.

The meeting was then adjourned until Friday, November 24, 1916, at 10:00 a. m., at the office of the general secretary of the Associated Manufacturers of Electrical Supplies, 62 Cedar Street, New York.

An invitation will be extended to all manufacturers of magnet wire, whether members of the Association or not, to attend this next meeting, at which time the Committee will be finally organized and different lines of activities decided upon.

Toledo Jovians Planning for An Electrical Show.

Marvin W. Hanson, newly appointed First Tribune for Toledo, O., with other local Jovians, is giving special attention to preparations for the big electrical show to be held at the Terminal building, December 4 to 16. Some splendid exhibits are being arranged for and large crowds from all over Northwestern Ohio and Southern Michigan are expected to be in attendance. The affair is being specially advertised and the last week of the affair will be held in conjunction with an extensive land show. America's Electrical Week celebrations will be given prominence on the program for the first week.

A contribution of 25 cents each for every member of the local order of Jovians was placed in the hands of First Tribune Hanson, to be sent to New York City and applied towards the expense of permanently flood-lighting the Statue of Liberty.

Lou Lemen, of the new-business department of the Toledo Railways & Light Company, has been appointed Second Tribune for Toledo.

Texas Electrical Contractors Hold Annual Convention.

The Texas Electrical Contractors' Association held its annual convention in Dallas a few days ago, about 30 contractors being in attendance. It was presided over by President W. H. Earl, of Dallas. The discussion covered a number of matters relating to the welfare of the members of the organization. The social features of the meeting were very enjoyable, and embraced among other things a banquet at the Adolphus Hotel, at which Mayor Henry D. Lindsley was present and made an address.

Biennial Meeting of the Electrical Committee.

The biennial meeting of the Electrical Committee of the National Fire Protection Association will be held in March, 1917, in New York City, the day and place of the meeting to be announced later. As usual, the provisions of the National Electrical Code as they now exist will be considered, together with reports of all sub-committees.

Suggestions for amendments to the Code, in order to be included in the Bulletin, must be specific and where a change is desired in a rule or section of a rule, *definite wording for such change must be given* together with the reasons why the change is recommended and these suggestions, together with all committee reports must be in the hands of the secretary *not later than January* 15, 1917.

The secretary, to whom communications should be addressed, is Ralph Sweetland, 141 Milk Street, Boston, Mass.

As heretofore, the meeting will be open to all interested and such persons will not only be welcome but are urged to be present and give the committee the advantage of their experience and advice.

New York Inspectors to Discuss Concentric Wiring.

The November meeting of the New York Section of the National Association of Electrical Inspectors will be devoted to "Concentric Wiring" and the principal address will be made by Thomas H. Day, of the New England Insurance Exchange. Mr. Day will have on hand complete samples of the fittings that are used in connection with this system of wiring both here and abroad. The meeting will probably be held on Monday evening, November 6, in Room 507, Municipal Building, New York City, but at time of going to press this date is still subject to change.

Executive Committee of National Electrical Contractors' Association at Cleveland.

The Executive Committee and Publication Committee of the National Electrical Contractors' Association of the United States held a meeting at Cleveland, October 4 and 5, and one afternoon were guests of the National Lamp Works of the General Electric Company, at Nela Park. A report of this meeting was published on page 769 of our last issue.

In the above group, lower row, reading from left to right are: Paul H. Jaehnig, Newark, N. J.; W. C. Peet, New York City; G. M. Sanborn, Indianapolis; J. T. Marron, Rock Island; Robley S. Stearnes (president), New Orleans; M. G. Buchan, Cleveland; J. S. Hilton (treasurer), Syracuse. (Second Row)—J. A. Fowler, Memphis; G. H. Duffield (secretary), Utica, N. Y.; G. E. Shepherd (chairman, Publication Committee), Wilkes-Barre; Harry C. Turnock, Cleveland. (Top Row)—Harry C. Brown (assistant secretary), Utica; S. E. Doane (chief engineer, National Lamp Works, of General Electric Company), Nela Park; W. C. Harrington, Cleveland.

Holiday Business for the Electrical Industry

The Christmas Shopping Season—the Most Profitable Merchandising Period of the Year—Abounds with Opportunities for Increasing the Popularity of Electrical Gifts and Extending the Use of Electricity

WE ARE again approaching the holiday season. Christmas will soon be here, even if the newspapers do not yet announce the exact number of shopping days left. The few weeks preceding the holidays are exceedingly rife with opportunities for trade—it is a season for a great harvest of retail sales in which there exists the greatest demand for every article that can be classified as a "gift." The holiday season is ideal from a merchandising standpoint. Great crowds flock to the retail districts in every city in the country. Their demands for Christmas goods do not have to be created; they exist insistently. Gift suggestions are welcomed. It is only necessary to show the shopper an article that he or she will think entirely suitable for father, mother, Ann or Charlie, and the sale is made. A great host of selling opportunities is at hand, marking the culmination of a year's activities, and the salesman has fortune in his favor. There is not a single working hour in the next two months when the salesman does not work with conditions to his advantage. Every hour that is not accounted for means the loss of opportunities that will not come again until another year, and the difference between great and mediocre returns—the latter is failure enough during this bountiful sales period—lies in preparedness for the season.

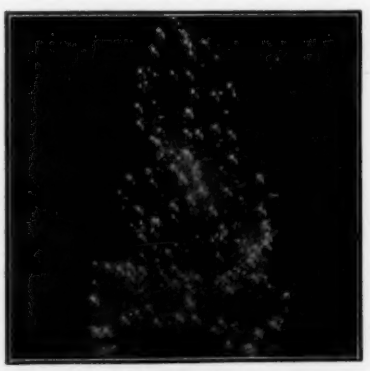
Profitable Market for the Electrical Trade.

Exceptionally broad are the opportunities presented to the electrical industry during the pre-holiday season. Every branch—be it dealer, contractor, central station, jobber or manufacturer—can profit by the greater demand and by intensive selling propaganda that should be a natural consequence of such a market. Then, too, there is the opportunity of diverting the rivers of money from other channels into that of things electrical. Ask anyone who knows about the Christmas sales of electrical goods and the answer is the same "more and more every year." It is a good sign—this undercurrent felt by everyone that the sales of electrical gifts will greatly increase each year—it is the best indication that they will.

Holiday Trade and the National Markets.

It would be as hard to estimate the amount of money spent for Christmas goods each year as it would be to conceive the result that would be produced by the abolishment of the holidays themselves. Aside from the religious and social activities due to the season, a tremendous influence is exerted on the commercial world. No industry however remote in its relation to the celebration of these days, escapes the effect produced on trade.

Only a few years back the different branches of the electrical industry were not greatly concerned about Christmas sales. Today it is hard to find any central station or dealer that does not push sales harder at this time of the year than any other. Nor do manufacturers or jobbers omit to call forth the best efforts of their respective advertising staffs in submitting sales campaigns that sometimes assume national proportions.



The point is this: The electrical industry obtains a certain percentage of the merchandising sales made in this country during the year, and it is certain that in bygone years this

percentage has not been maintained during the holiday shopping season.

Unquestionably the sales curve has not risen to the heights it should during the last few months of the year. It should be made to look still higher up in the world. The men of industry have come to a better realization of this fact. A firmer grasp of the situation is being secured, the opportunities presented have become more vivid, modern merchandising methods have been instituted, and co-operative sales and profit-producing movements have been carried out—all with the purpose of increasing the revenues during the season to the proportion that they should be. Recent results have been gratifying, and much credit is due to the men that have aided in promulgating and accomplishing them. But everyone believes—and rightly—that there are still greater possibilities in the holiday season as a means of producing business for the electrical industry. What to do is to study conditions a little closer, and with proper initiative the efforts will bear the results that should be attained.

Competition to Be Met by Electrical Interests.

There is no single class of merchants that enjoys profits from the holiday trade that does not make special preparations to secure this business. Their methods are borne out of long experience and stand the test. They know what stock to buy, how to buy it, how to make the proper appeal to prospective purchasers, and—most of all—how to complete the sales. They meet keen competition and meet it well.

This assembly of forces, this organization for producing sales, is the kind of competition met by the electrical dealers, and the successes the latter have made have been accomplished by the use of the same methods, the same weapons. Perhaps by want of long experience, those weapons have not been as keen or as skillfully handled as they might have been. The future, however, will tend to that.

Because of their high-class organization we must look to the department stores as examples of what can be done along retailing lines during the Christmas shopping period. Their preparations are manifold. From keen foresight in buying, correct presentation of stock for selling, appropriate window and interior displays, adequate sales forces, all wreathed in the Christmas spirit, it is one long, concerted effort to make the most of what the season brings in merchandising opportunities. Long experience has shown the way to the best selling methods. The harvest is in view. Then sow well, cultivate well, and then reap well.

Manufacturers and wholesalers of Christmas goods are as shrewd as the retailers in marketing their products. The former are quick to anticipate the demands of the trade and to supply them. What is more, they make every effort to devise articles that will catch the fancy of a fickle public and create demands. Or they modify the styles of old products so that they can be presented in new form to make a revived appeal to purchasers. The manufacturers realize that the best method of marketing their products is to satisfy the tastes of consumers and so make the retailing as easy as possible. Christmas gifts are packed in holly boxes, appropriate cards are provided for the givers, packages are packed ready for mailing, and similar service is offered to purchaser to facilitate selection, mailing or delivery.

Christmas Sales Activities Necessary.

It is not necessary for the electrical dealer to make as great or as elaborate a display of Christmas goods as the department store. Nor is it feasible. But some of the merchandising methods used can be applied to good advantage. Especially is this true of means for attracting trade. The department stores are fortunate in that the public has become accustomed to purchasing many of its Christmas wants in them, this being due to the diversity of stock found in no other establishments. It is a great advantage. Added to it they are able to employ the best window-dressing and decorative talent for luring the prospect inside the store.

Not so with the electrical dealer. Habit does not work to bring the shoppers to the electrical store for their Christmas gifts. This disadvantage must be overcome by sales ingenuity on the part of the dealers. They cannot afford to rely on last year's customers coming back or spreading the gospel of electrical appliances for Christmas gifts, nor can they afford to let the crowds pass by on their way to the department stores. It is true many retailers are content to

High Spots in This Article—

Men in the electrical industry are beginning to realize more vividly the opportunities that are presented during the holiday shopping season.

It is a bountiful sales period, ideal for merchandising. Every salesman works with fortune in his favor.

An organization of modern merchandising methods is necessary to meet the competition encountered.

It is a good sign—this feeling of confidence that the sales of electrical goods for gifts will increase—it is the best indication that they will.

The increased selling efforts are beneficial to every dealer, jobber, manufacturer, central station and contractor.

The Electrical Manufacturer and the Jobber Have Much in Common in Their Relation to Other Branches of the Industry.

know that the season will bring good business and believe that any extraordinary effort to secure business is not worth the time. The fact is to be regretted. It is worth while—more so than at any other time of the year, and they should stir themselves up to wide-awake and up-to-the-minute activities, and not let the opportunities pass.

Increased Selling Effort Is Beneficial.

These activities are justified because there are other returns besides the money that comes to the cash register. While the stock turnover is gratifying, the activities themselves should be a tonic to any business, reflected not only on the owners, but upon the whole business organization. The sales problems call for resourcefulness, the competition for force, the success for ambition, and the mistakes for better methods. The results obtained each year serve as marks to be aimed at and beaten if possible the following year, thus tending to place results on a higher standard.

To the entire industry the publicity and prominence attendant upon the increased sale of electrical appliances is a stimulus and a trade asset of utmost value. The results are so sure, are bound to be so satisfactory, and can be made so far-reaching that there can be no excuse for not expending the added effort in a season when the opportunities are the greatest. The game is certainly worth the candle.

Electrical Appliances for Christmas Gifts.

As holiday gifts, electrical appliances make their greatest appeal to the public because they possess utility. It is impossible to name even one that does not do something—actually accomplish something. Saving labor and providing convenience and comfort is their purpose. They find their places in the hearts of practical people, who obtain a great deal of pleasure in their operation.

Besides being of utility, all electrical devices are novel, modern, comparatively inexpensive and attractive in appearance. Few users possess all of the many useful appliances that have been placed on the market, and the presentation of some one of the very latest articles carries with it a degree of novelty that is pleasing to the recipient, who gladly adds it as a newcomer to the collection of useful electrical devices. To those who have never had much experience with electrical appliances their novelty is always great. People, too, are always on the lookout for something new, and, because they are modern, electrical gifts give their owners a sense of pride. The manufacturers are entitled to much credit for the attractiveness of their products, not only in design, workmanship and finish, but in durability.

Increase the Use of Electricity

The aim of everyone connected with the electrical industry is to increase the use of electricity.

This unanimity of interests should bind all together in the effort to accomplish this purpose.

The keynote of all activities during the holiday season is co-operation—it is a poor time to "go it alone."

Every branch of the industry should lend its aid in the retailing of current-consuming devices during these banner months for the merchandiser.

The publicity given by increased sales of electrical goods is a stimulus of utmost value to the industry, giving enormous power in extending the use of electricity.

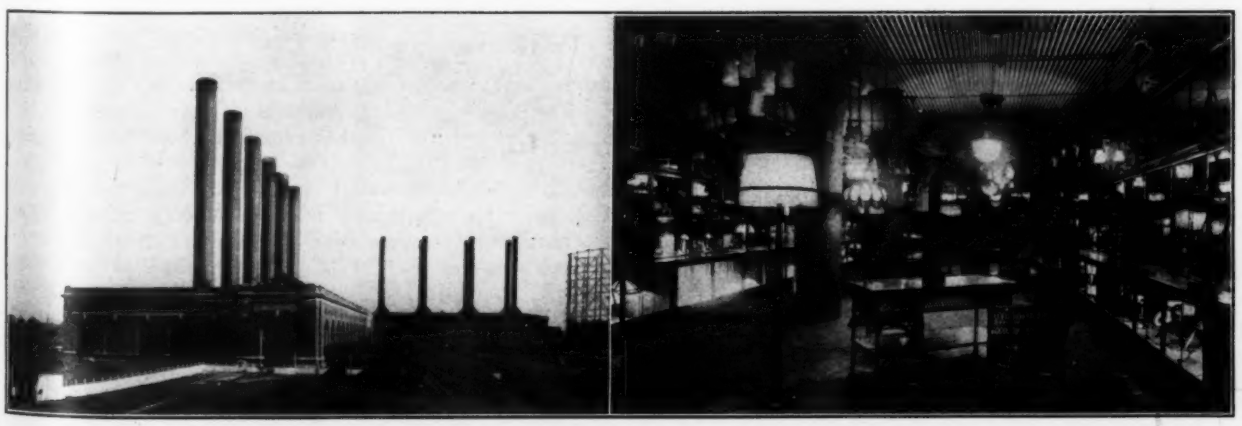
Increasing the Use of Electricity.

Without exception each branch of the electrical industry has the ultimate aim of increasing the use of electricity. It is the purpose of every business and every man connected in any way with the industry. With such a unanimity of interests any movement that fosters the sale of current-consuming devices should be supported by every electrical man. The greatest problem confronted in the effort to popularize electricity is to educate the public to its uses and their diversity. In those of the industry that deal directly with the consumer lies much of the responsibility of this work, and it is for this reason that the merchandisers of electrical goods hold such an important place in the industry and have such great opportunities for demonstrating the utility of their wares. But they are not alone in their responsibility. Every other branch has its avenues of activity in which to interest the consumer in the applications of electricity.

The pre-holiday period is primarily a merchandising season, one that affords greater contact between the public and the industry, giving the best opportunity for diversifying the use of electricity. And since the campaign is of a merchandising nature, it is necessary that the activities of every branch of the industry should be turned in that direction—to aid and facilitate the merchandising of current-consuming devices during these banner months of the year.

Co-operation the Keynote of Activities.

The importance of co-operation during the Christmas shopping season can by no means be overestimated—it should be the keynote of activities. The success of Electrical Prosperity Week last year, one of the biggest trade



The Central Station and the Dealer and Contractor Need Co-operation in the Actual Work of Dealing with the Public.

movements in commercial history, was the result of the co-operative efforts of the members of the Society for Electrical Development. Such an event, which constitutes a special drive on electrical matters, focuses the attention of the public to the use of electricity during certain definite periods and is of such importance that everyone connected with the industry in any way is emboldened to assist similar movements. It is a poor time for any member of the industry to "go it alone."

Central stations should be, and usually are, the prime movers in co-operating to produce sales of current-consuming devices. Everyone appreciates the position occupied and benefits secured by them during such campaigns. Because of its influential position in the community, the central station is able to secure the aid and co-operation of the chamber of commerce or board of trade, city officials, newspapers, Rotarians and other civic bodies, and is able to lead in instituting an electrical show and parade, a white-way installation or celebration, the installation of an electrical Christmas tree and festoon lighting, a co-operative electrical advertising campaign, flood-lighting installations, house-wiring and store-lighting campaigns, and like movements, any one of which benefits the industry as a whole. In local work the central stations should play a very important part.

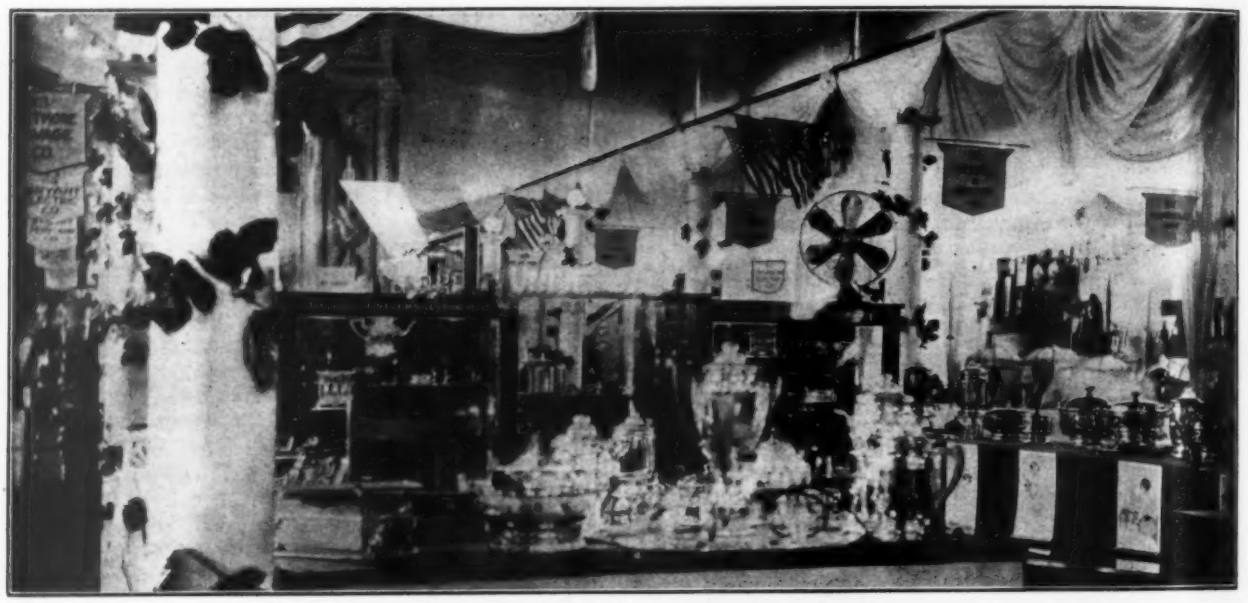
Manufacturers of electrical goods appreciate fully the opportunities of the season and the necessity of making a determined effort to secure a full share of the business. They have developed sales helps of utmost utility to the merchandisers, giving them the results of their extensive sales experience in the effort to facilitate the retailing of their products. Their national advertising campaigns are of great importance in interesting the consumer and aiding the dealer.

The activities of electrical jobbers are usually limited to their own retailers. The least they can do is to lay in a proper stock of holiday goods, instruct salesmen to push them during the season, circularize the trade, and urge and assist dealers to make displays that will compare favorably with those of retailers in other lines. Jobbers doing all this properly and thoroughly will have outlined enough to keep them busy on the subject of holiday merchandise, and the results will be reflected in the efforts of the dealers.

To electrical dealers and contractors the pre-holiday season will be teeming mostly with merchandising activities. It is their chance to develop and use modern methods of retailing. Paying particular attention to the attractiveness of their window displays and installing Christmas decorations should not be overlooked, no more than imbuing salesmen and themselves with the Christmas spirit. It will be a period of optimism in electrical sales, and the dealer should spread it by heartily joining any movement that makes for bettering the business. Increased sales of appliances mean the need of more outlets, more wiring, and the contractors cannot help but realize their obligation to the remaining branches of the industry that aid them in securing contracts.

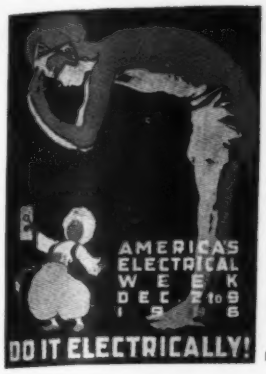
To the entire electrical industry the Christmas shopping season is an occasion for business building, an exceptional opportunity for stimulating the public interest in the use of electricity. And in this period, given to quickening sales, the all-the-year-round utility of electrical appliances can be emphasized and impressed permanently on customers. It should be made to start the public thinking so that it will in the future increase the use of electricity through the employment of the thousand and one labor-saving devices and conveniences that can only be had through the medium of electrical energy.

What the Public Wants to Know Is How to Use Electricity



Electric Shows Do Much to Explain the Uses of Electricity.

A joint exhibition of electrical appliances on a busy retail street attracts the most attention, sells the most merchandise and receives greater publicity than any other form of co-operative movement. The novelty of such exhibitions draws people who could be reached in no other way, who are not aware of the utility of electrical devices, and who are given the opportunity of learning the value of electric service. Business men are prone, in giving consideration to any subject that will affect their business, to consider only the immediate results that are obtained, and give little thought to the effect that electric shows will have on their future business. Too much cannot be expected in the way of actual sales, because some of the profits are in the nature of publicity that cannot be secured without expense. It is even advocated by some that these special exhibitions and sales should be continued after Electrical Week until the holidays. However, one point must not be lost. In centralizing the sale of appliances to some temporary exhibit dealers must direct customers to their permanent places of business, the public may know where electrical goods are sold during the entire year.



America's Electrical Week and Plans for the Holidays

How the Entire Electrical Industry Can Co-ordinate Christmas Activities with the Nation-wide Co-operative Campaign Planned for Electrical Week

EVERY electrical man whose imagination has been stimulated by the rapid strides of the electrical industry has dreamed of a time when there shall be truly electric cities, clean and smokeless, brightly and pleasingly lighted throughout; when human drudgery will be no more, electricity performing all menial tasks at the touch of a button and leaving man to devote his energies to higher things; when life will be made more healthful, wholesome and sweet by the manifold and extensive uses of electricity; in short, when the ideal electrical future will be achieved.

Converting Ideals Into Reality.

Are such dreams merely castles in the air or are they realizable as well as pleasing ideals? About a generation ago they would have been regarded as visions of a disordered brain. So rapid has been the electrical development since that time, however, that such ideal conditions are doubtless easily attainable, not in the remote future, but probably within the lifetime of many now active electrical men. We are but on the threshold of the age of electricity. The extent of its possibilities is undreamed of.

If we but think back some twenty-five years ago, we recall that electrical applications were very few and far between. Electric lighting had been applied to only a small extent for interior illumination. The electric motor was just beginning to be used. Only a few electric street cars were to be seen. Electric vehicles were entirely unknown. Electric heating likewise was unheard of. Telephones were still something of a novelty. We need merely look about us to note the remarkable contrast brought about by extraordinary electrical developments in such a short span of years. There is absolutely no reason why these developments should not continue at a similar or, in fact, even rapidly increasing rate.

Permanent Flood Lighting of Statue of Liberty to Open America's Electrical Week.

As a specially appropriate national inaugural of America's Electrical Week, the permanent installation of flood lighting for the statue of "Liberty Enlightening the World" will be dedicated on December 1, the eve of a week of electrical activities on a scale greater than ever yet conceived. The illustration shows this famous statue in New York harbor illuminated by the searchlights of a battleship and gives some idea of the permanent flood lighting, which is made possible by $1 contributions from every section of the country. The extensive publicity that will be given to this patriotic event will arouse the entire country to keen interest in the celebration of the Week.

Conceding that the ideal conditions referred to are attainable, or at least worthy of striving for, how can their realization be hastened? It is clear that they can not be attained through any sudden, universal electrification. It is also evident that if left to unaided progress the happy days desired will be a long time in coming. But by making possible and consistently advocating more extensive use of all electrical applications and at every opportunity pointing out their advantages, the electrical millenium can doubtless be very materially accelerated.

The significance of this is that the electrical industry has practically within its grasp a brilliant future, far greater in scope and profitableness than it has yet conceived. The extent of its returns will depend almost entirely on the degree of aggressive effort put forth by the various branches of the industry, both individually and collectively.

Electrical Holiday Trade a Good Beginning.

Just now we are approaching a most extraordinary trade activity. The probabilities are that the amount of money that will go into circulation for strict holiday trade this season will exceed by many millions of dollars that expended in any previous year in this country. The opportunities for the electrical industry to take a proper share in this exceptionally heavy trade movement are splendid. The details of this matter are discussed at length in the preceding article, so it will suffice here merely to state that no stone should be left unturned to realize on these opportunities.

Each branch of the industry must study the situation to determine in what manner and to what extent it can participate in this special business. Certain elements of the industry, of course, are not affected directly by strict holiday trade, but in any case an indirect benefit

comes to practically the entire industry from exceptional activity by several of its branches.

Individual Boosting Brings Returns.

The immediate benefit of a big holiday electrical trade is felt by central stations, local dealers, jobbers and manufacturers. These elements, therefore, naturally must take the lead in boosting the holiday business. Each individual company or firm in those different lines will be well repaid for whatever active part it takes in aggressive promotion of increased Christmas trade. Where individual action must be undertaken in the absence of concerted effort, it should be of constructive character.

Co-operative Boosting Brings Much Greater Returns.

Every one knows that team work can accomplish things that individual efforts either never could bring about at all or could complete only after a long time and excessive exertion. This general rule applies with great force to trade promotion. In connection with holiday electrical trade a combined campaign undertaken by the related branches of the industry is bound to produce vastly greater results than if carried on by only one branch.

There are many advantages of co-operative trade-building campaigns. It is a well known fact in salesmanship that repeated impressions on any prospective purchaser, especially when they come from different non-competitive sources or agencies, greatly accelerate his decision to purchase. Consequently with every electrical man pointing out the desirability of electrical gifts, an enormous number of them should be sold, in fact, vastly greater than has hitherto been conceived possible.

Another advantage of co-operative trade promotion is that each link in the chain of interests that benefits bears a portion of the cost and effort involved. The liability of working at cross purposes is also removed and replaced by joint action for the common good.

Desirability of National Co-operative Campaign.

In the foregoing there has been briefly pointed out the desirability of active participation in the holiday trade by all electrical interests that can profit thereby. The desirability of making this participation co-operative has also been shown.

Now, if it were readily possible to make this co-operative movement national in character and broadened in scope, the stimulus it would give to the entire industry would be so great as to warrant every electrical man taking a very active part in its promotion. Such an opportunity presents itself in what will be celebrated as "America's Electrical Week."

Electrical Prosperity Week—1915

A few of the noteworthy results of Electrical Week last year were the following:

Electrical shows were held in 28 cities and towns, drawing nearly a million visitors on whom the advantages of electricity were so impressed that thousands of appliances were sold during the Week and thousands later.

About 170 local chambers of commerce and boards of trade actively co-operate in the civic and commercial events.

The Week brought together for the first time in many cities all of the electrical interests in a big co-operative movement to the immediate and future advantage of all concerned.

Every manufacturer, jobber, central station, dealer and contractor who participated felt well repaid for the time and money spent.

Conception and Origin of Electrical Week.

About two years ago a number of prominent and progressive men of the electrical industry discussed the value of such a co-operative national electrical-promotion movement. It was felt that while the industry was making steady and quite satisfactory strides, a decided expansion

Night View of a Progressive Western City, Showing Possibilities of Great Electrical Development.

Most American cities have experienced considerable electrical development, but so far it corresponds chiefly to the little spots shown scattered throughout the above illustration. What possibilities the future holds for the electrical industry are indicated by the brilliance of the electrical developments in the center of the picture. Street lighting is only one branch of electrical activity. There are equal, if not greater, possibilities for more intensive development in all other electrical fields. To realize them, the electrical industry must lose no opportunities for aggressive and intensive business-building, such, for instance, as are presented by the national celebration of America's Electrical Week from the second to the ninth of next month.

of its business could be brought about by a nation-wide publicity and sales campaign that would call the people's attention to the great utility of electricity and its advantages in promoting general welfare.

The consensus of opinion was that such a general campaign could be tied in with the movement for promoting larger electrical holiday trade by setting apart a week at the opening of the Christmas shopping period. The week from November 29 to December 4 last year was therefore selected as "Electrical Prosperity Week." This name was intended to show the intimate relation between general use of electricity and prosperity.

America's Electrical Week—1916

Some indications of still greater success of Electrical Week this year are as follows:

Advance publicity on a scale never approached is putting the entire country on the qui vive for Electrical Week and popularizing its message—"Do It Electrically."

A larger number of civic and even national features will widen the interest taken in the events of the week.

The plans for the many distinctively electrical activities of the week are on a much larger scale and even more highly developed than those so successful last year.

Every branch of the electrical industry is preparing to avail itself of the prosperity of the country through this national trade-boosting campaign.

Success of Electrical Week Leads to Repeating it This Year.

This first electrical week was a marked success in every place through the country where its celebration was entered into. It was organized and conducted under the general auspices of the Society for Electrical Development, a co-operative national organization representing the principal branches of the industry and supported by its most progressive companies and firms. The Society carried on a most extensive publicity campaign, and aided the local committees in every possible way to make the week's celebration noteworthy.

The results showed that the idea of an electrical week was a good one and wherever it was carried out it made a valuable impression on the public, not only by greatly stimulating the holiday trade in electrical goods, but in creating a desire for electric service and things electrical that was felt in increased business for many months.

In view of this pronounced success it was decided to repeat electrical week this year on a much larger scale, incorporating in its celebration the benefits of last year's experience. It may be expected, therefore, that the first week of next month will see probably the greatest trade movement ever undertaken in this country.

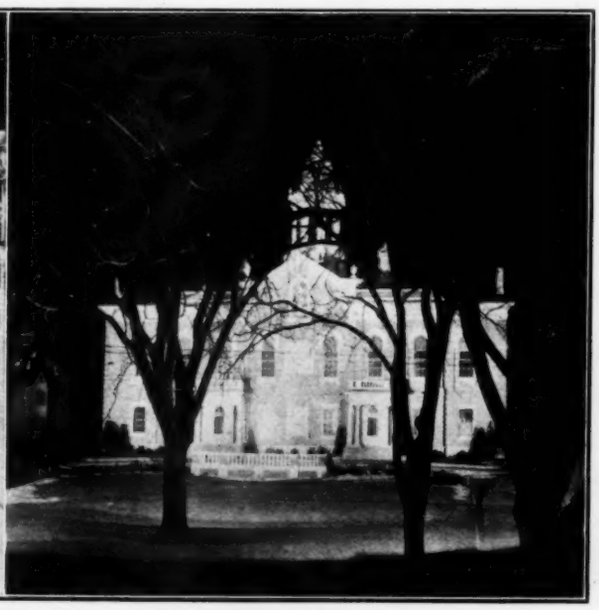
The dates selected for celebration of electrical week this year are psychologically correct for making it a strong holiday campaign. Thanksgiving Day this year falls on November 30. The following day is one that must be set aside for recuperation from the effects of feasting. Saturday, December 2, therefore, is the earliest day that can be effectively selected for opening up the holiday shopping season. The entire following week will be devoted to extraordinary efforts to impress on the public the general value of the shop-early principle. Through this week's special campaign the electrical industry, by united action, can get in on the ground floor, so to speak, of the holiday shopping. The sales value of this early campaign is therefore self-evident.

General Aim of America's Electrical Week.

The broad aim of America's Electrical Week is primarily to increase electrical sales. This general aim may be subdivided into two closely related objects. The first is to promote an immediate and very large holiday business in electrical goods. The second is to point out to the public the general utility of electricity and its ready adapt-

Up-to-Date Street Illumination.

This illustration of the lighting of Main Street in Salt Lake City, which was recently completed, gives an idea of what strictly up-to-date street illumination is. The inauguration of such installations, or even much more modest ones, may give a desirable civic character to Electrical Week celebrations and thus bring about the active co-operation of civic organizations.



Flood Lighting of Public Building.

The flood lighting of public buildings so as to reveal their architectural beauty by night as well as by day has proven a very popular way of developing civic pride. This view of the court house at Plymouth, Mass., shows another suitable civic feature for Electrical Week, one which by stimulating community pride also promotes good will.

ability for practically all purposes; in this connection special emphasis is laid on the slogan "Do It Electrically." The general idea back of this broad second plan is to produce a universal appreciation of this as the age of electricity, so that when any problem presents itself electricity will naturally be thought of as its logical solution. Through this broad and general propaganda emphasis will be made not only on immediate sales but on the creation of a strong desire for electrical service and electrical commodities which will greatly facilitate sales in the future. From the foregoing it is evident that this broadened aspect of electrical week aims to benefit every branch of the industry and thus bring to many of its elements valuable returns that would be rather remote from a campaign conducted for purely holiday business only.

Central-Station's Float in Electrical Parade.

An electrical parade is sure to bring out the crowds. The floats should be original and as distinctively electrical as possible. The Philadelphia central station's float pictured above shows that it is not difficult to rig up an electric truck to present a pleasing and yet effective electrical message. This was only one of fifteen electric floats entered in last year's electrical parade by this central station.

The official poster selected for America's Electrical Week gives a very clear, as well as artistic, impression of the general object of the celebration. It has the human appeal that is so important in any general propaganda. The poster is very appropriately designated as "The Modern Aladdin."

It makes use of the story of Aladdin of the Arabian Nights tales. It brings the story in a strictly up-to-date form by showing the all-powerful slave as being summoned, not by the rubbing of Aladdin's lamp, but by the mere pressing of an electric button. The instant that the button is touched this modern genie, electricity, appears and is ready to perform every desire of its master. Instead of bringing precious stones, it satisfies those far more important modern desires, the demand for light, heat and power. This very effective design can consequently be counted on to make a most powerful appeal upon the public in general.

National Publicity.

Both in order to secure a design that should be as artistic and effective as possible, and in order to make the proposal to have an electrical week generally known, a contest for the selection of an official poster that was the most extensive ever conducted was carried on. Announcements of the poster competition were sent broadcast to practically all art schools, high schools, illustrators, etc., and a total of 781 poster designs were submitted by as many individual artists throughout the country. A carefully selected and capable body of judges deliberated for many weeks before the final selection was made. $2,200 was used for the prizes awarded for the best posters. The official design adopted was submitted by Harold von Schmidt, of San Francisco, and drew a prize of $1,000.

Following the close of the actual contest, 125 of the best posters submitted were selected for use in a series of public exhibitions which have been held in over a score of cities, and which it is expected to continue for many more weeks. The entire array of these best posters

General View of a Co-operative Electrical Show During Electrical Week.

The success of the shows held in some thirty cities and towns during Electrical Prosperity Week last year demonstrated the value of these undertakings. To give an electrical show does not require a big, special exhibition building. The illustration above shows how an old telephone building was converted into an attractive exposition by simple and inexpensive decorations. This show, at Memphis, Tenn., also illustrates how co-operation, through the Jovian Order or other means, can promote the success of an affair of this kind, even though it be modest. To indicate that even in a small community an electrical display may be made a success, it may be cited that in Glenwood Springs, Colo., a town of about 2,000, an electrical show was conducted by two persons, who spent only $50, but sold over $300 worth of electrical appliances.

has been taken from city to city, thus bringing to the attention of thousands the ideas back of electrical week. This contest and the following exhibition have therefore been able to make a most extensive impression throughout the country. Along with this has been the liberal mention in the newspapers, both of the poster contest and of the general plans for elecrtical week. With such extensive publicity it is to be expected that the general public will take keen interest in the actual events of the week, which is an added reason why every element in the entire industry should take part in it actively.

Progressive Electrical Dealer's Sales Room.

Pleasing general arrangement, excellent lighting and at least a few decorations make a strong appeal to all visitors to electrical sales rooms, particularly so during a period like Electrical Week. The store shown is that of a wide-awake Indianapolis electrical dealer and contractor. Regardless of what co-operative features are undertaken, every dealer should make his premises equally attractive.

Just before the opening of electrical week, important articles will appear in several of the best known national magazines, emphasizing the value of electric service for all purposes, and pointing out the extensive achievements already attained through its utilization. Leading electrical manufacturers and probably some large jobbers also will do very generous national advertising, which further will focus public interest in the objects of the week and the desirability of taking interest in its doings. All this national advertising, of course, will increase the value of the local publicity.

Organization of Activities.

The general scheme of organizing and co-ordinating the various local activities of America's Electrical Week is being conducted by the Society for Electrical Development from its New York headquarters. The earliest work undertaken was to call the attention of the industry to the general proposal. The poster contest and exhibition were then undertaken. In each city that showed any interest in the movement a local chairman was selected. The Society has kept in touch with the committees selected by these chairmen, both through correspondence and special representatives from its own staff, who have made personal visits to the various cities, especially when meetings of the actual boosters were being held. Thus the local committees have been able to secure direct advice and stimulation of enthusiasm for the undertaking. To these committees has been left the determination of the actual details of the co-operative work to be undertaken in each city and the general extent of the local celebration. All members of the Society have been freely supplied with a large amount of literature, calling attention to the general scope of the week and the large variety of ways in which individual companies and firms can participate.

Naturally, the plans for the local activities are well advanced at this time. However, it should be emphasized that it is by no means too late to have at least some definite and special celebration of the week. If the event is to have the greatest possible result, it should be carried out universally in every city, large and small. It is through this universal celebration of the week, and by making it impressive, that the full national scope of the celebration can be realized.

Central-Station's Display Room Arranged for the Holidays.

The central station, being the permanent gainer from increased uses for electrical energy, should logically take the lead in liberally boosting any movement like Electrical Week. Even though it may not sell appliances, it should display them attractively. The illustration shows how a New Orleans central station dressed its display room for Electrical Week and the holidays so as particularly to impress feminine visitors who came in large numbers throughout this period.

Electrical Week Window Display.

An interesting window display is bound to attract the passer-by. A house-wiring campaign during Electrical Week may be made to appeal to pedestrians by an interesting window display, as shown above in the reproduction of one of the windows of the Philadelphia central station, which conducted a successful wiring campaign that was materially aided by this display.

Local Co-Operation Necessary for Most Effective Execution of Plans.

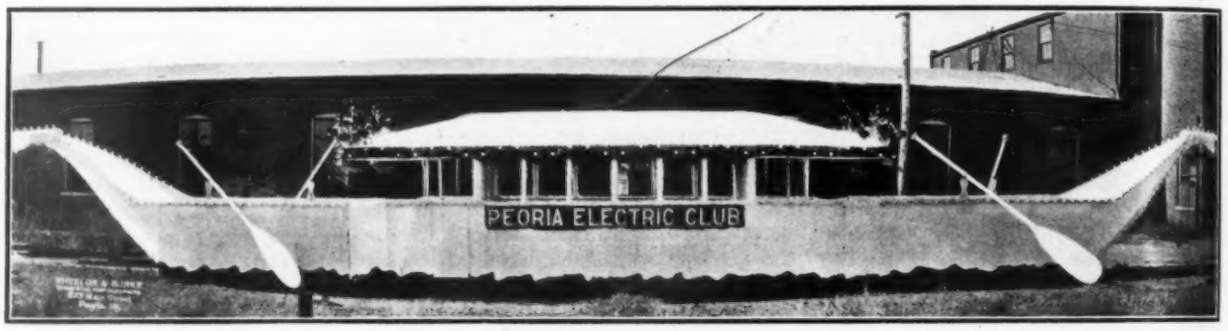
To carry out whatever local plans are considered desirable, full co-operation of all local electrical interests is necessary, not only to prevent the possibility of working at cross purposes, but in order to present an impressive, comprehensive and well co-ordinated plan for each day of the week. It is only by such a united plan that the much desired co-operation of the local chamber of commerce or other civic organizations can be secured. Such bodies are usually strong boosters of any celebrations that will bring people to their towns.

Civic Character of Celebration Desirable.

In order further to stimulate the interest of all people in the community and from nearby districts, it is highly desirable to give a civic character to the celebration without losing its message of "Do It Electrically." In this connection marked success has followed the plan of inaugurating some important public or semi-public electrical installation on one of the evenings of electrical week, this being only one feature on a more extensive program.

For example, the opening night of an ornamental street-lighting system always attracts large crowds of people, if

Electric Gondola Float in Civic Pageant



An illustration of the strikingly unique and picturesque effects that may be attained through co-operative action by electrical men entering into any civic celebration is shown by the illustration of the Peoria Electric Club's float, which won first prize in a recent civic parade. The body of the float consisted of a trolley car with a flat car in front and in back. Its total length was 97 feet. It was lighted by about 1,000 lamps operated from a 550-110-volt motor-generator. Four husky electricians acted as gondoliers, their oars containing green lamps. The float was made possible by the co-operation of the local street-railway company with all other electrical interests, the lamps and wiring being furnished by electrical dealers and contractors.

given some advance publicity in the newspapers. Flood lighting of a public building or monument can be made a similar drawing event, besides possessing the element of novelty to thousands who have never seen it done. In the medium-sized or smaller cities the donation of an electrically lighted slogan sign to the community by the central station, or preferably by all the electrical interests, creates that good will which is so great an asset in any trade movement. A municipal Christmas tree, electrically lighted, makes a very good impression.

Even in the smallest towns it is possible, at least, to donate one or more electric flags to be mounted conspicuously on the city hall, principal school, or other public building.

Special Lighting, Decoration and Electric Signs.

By making any of the foregoing or similar features prominent in the general plans it is also easier to secure the co-operation of merchants in special decoration and illumination of their windows, store fronts and the entire streets. To give the latter a festive appearance at comparatively low cost, streamers of incandescent lamps can be strung across the street or along the curb, using trolley poles for supports. Flags should be prominent in the decorations, because it is to be "America's" Electrical Week; electric flags should be used as much as possible. Evergreens and other seasonable decorations are especially appropriate. By avoiding cheap bunting the special decoration may remain in place until the holidays without presenting a bedraggled appearance from exposure to the elements.

Naturally, the central station, electrical dealers and other electrical firms should take the lead in special lighting of their premises. At least the store windows and the interiors of all electrical stores or salesrooms should be brightly and pleasingly illuminated. Electric signs should be freely used to call attention to these electrical centers. By thus setting a good example it is easier to get other business houses to light their windows properly and to use electric signs.

Electrical Parades.

In the medium-sized and larger cities it is possible to attract a great deal of favorable attention by conducting a parade, preferably exclusively electrical. If there are quite a number of electric vehicles and trucks in town, they may compose the entire parade, the trucks in many cases being suitable for use as specially arranged floats. All cars entered in the parade should be specially decorated and, if possible, specially illuminated. Such a parade acts as a great boost for the electric vehicle, demonstrating its elegance and quietness of running and ease of control.

If it is possible to include at least a few special floats, these may be made to add great interest to the parade. With the present popularity of pageantry, a representation of local historical interest, or better yet a review of electrical developments with the presentation of some of the chief applications of electricity will make a splendid spectacle.

In some cities where there are not many open electric trucks available, it is possible to have the parade follow a definite route of a street-car line, in this case using several flat cars or other open cars hauled by a decorated trolley car. In all electrical parades music must not be forgotten.

Electrical Shows.

There is probably no plan for electrical week activity that is as effective in carrying out the objects of the week as an electrical show. Such a show always draws the people, more so than merely displays in salesrooms. It gives the best all-around opportunity to display all kinds of electrical appliances and devices and to demonstrate them to the largest number. Such an undertaking, of course,

calls for considerable expenditure, time and effort, but the returns are much greater than for equal expenditures made by individual firms in displays on their own premises. In any show it must be remembered that the results are not only immediate sales, but that lasting impressions are created on the spectators which bring about subsequent sales continuing for many months when their purses may be better filled.

If possible, the show should be free to the general public or, if a small admission is charged, prizes in various contests should be given to draw a large attendance. A good band, vocal or phonograph music should be provided; other entertainment is desirable also. Special lectures on appropriate electrical topics and demonstrations of a special character should be given on different days. For example, one day may be devoted to electric lighting, another to electric cooking, another to electric cleaning, one day (Saturday preferably, when children may attend in large numbers) to electric toys, and so on.

A comprehensive electrical exposition is, of course, best adapted for the larger cities. However, even the smaller towns can carry on a modest show effectively and at relatively low cost by close co-operation of all the local electrical interests. To keep down the expense the show may be open in the evenings only, or from 1 to 10 p. m.; only in the largest cities is opening as early as 10 a. m. warranted.

Local Publicity.

An important factor in all local activities is provision for ample advance publicity for all the events. Aside from billboard, window poster and various mail advertising methods, special attention should be given to the local newspapers. The editors should be supplied with full statements of what it is proposed to do long in advance as well as on each day of the week. Articles written in a popular style will also be gladly accepted by many editors; such articles should deal with the value of electricity in every-day life, its rapid developments, facts of electrical science, etc. All these help to focus attention on things electrical. One of the most valuable forms of newspaper publicity is a co-operative electrical page, double page or entire section of the paper, containing advertisements of all branches of the electrical industry, also short articles and notes on electrical subjects. Such an advertisement will not cost very much to each individual company.

Individual Activities to Reinforce Co-operative Plans.

Whatever co-operative plans are undertaken should be reinforced by the individual efforts of all the local electrical firms. For instance, special illuminations and displays should be made by every electrical dealer and contractor, as well as by the central station. Special sales may well be undertaken in many cases. Electrical week is a good time to announce the opening of new departments, new features of the service, reduced rates by the central-station, etc.

The practical cessation of new building work at the approach of winter makes this a good time to put on a campaign for old-house wiring, thus giving contractors an opportunity to tide over a period of relative inactivity without laying off men. Likewise, it is desirable to canvas customers for whom wiring has been done to see whether additional circuits or outlets can be installed.

Necessity for Active Participation Urgent.

Space does not permit touching on more than the principal and most successful plans for actively celebrating America's Electrical Week, nor can the details of each plan referred to be given at length. It is evident, however, that the general plan of celebrating an electrical week at the time selected fits into and satisfies all the needs of a special holiday campaign. It does more than that, for it broadens the scope of such a campaign and provides opportunities for profit for every branch of the industry.

In conclusion, it is necessary again to emphasize that the maximum returns to the entire industry can come only by active participation of every factor in it. No element can ignore so extensive and virile a movement. Whether one is selling electrical merchandise or electrical service, ample return is bound to come from getting actively into the undertaking. No electrical man, or woman, can afford to miss this splendid and other future opportunities to be a booster, individually and "All Together, All the Time, for Everything Electrical."

Plans for America's Electrical Week Being Rapidly Developed by Local Committees.

As reported in recent issues, the preliminary work in connection with America's Electrical Week is making rapid headway, and the Society for Electrical Development, which is in general charge of the undertaking, has received a number of pleasing reports from local committees throughout the country insuring a much more extensive and aggressive celebration of the week than a year ago.

In Cleveland, O., a number of subcommittees have been appointed to plan a city-wide celebration; one committee is working along the lines of special lighting, another for pushing the sale of heating devices, and a third for power devices.

At Louisville, Ky., an electrical exposition will be given in the Armory throughout the week, during which high-class entertainment will be provided. Special efforts are being made to induce all Louisville merchants to use decorative lighting liberally.

At Syracuse, N. Y., it is planned to have an illuminated parade of electric pleasure and business vehicles. Special street illumination and decorations of the newly lighted shopping center will be undertaken. It is probable that last year's electrical show will be repeated.

At Lexington, Ky., it is proposed to flood-light all public buildings, to provide illustrated lectures for school children and to arrange a city-wide celebration in co-operation with the Commercial Club.

The Society for Electrical Development has arranged for displaying the 125 best posters received in the recent poster competition in Cleveland, Dayton, Cincinnati, Lexington and Pittsburgh. Similar displays will be made from time to time, it being possible that the poster-exhibit tour will continue even into next year.

Electrical interests of Nashville, Tenn., have begun preparations for the celebration of America's Electrical Week. A committee named to handle the details and make preparations for the demonstration is composed of B. C. Edgar, general superintendent of the Nashville Railway & Light Company; Frederick Lawrence, of Herbrick & Lawrence, and J. P. W. Brown, superintendent of the lighting department of the Nashville Railway & Light Company.

Arrangements are being made in San Diego, Cal., for participating in America's Electrical Week, providing for a street parade, window displays, illumination effects, etc. H. H. Jones, general manager of the San Diego Gas & Electric Company, is chairman of the local committee.

The last five years' progress in things electrical will be demonstrated to the people of Memphis, Tenn., at a local celebration of America's Electrical Week, according to the plans of the committee, which is composed of Carl K. Chapin, of the Consolidated Gas & Electric Company; W. R. Herstein, of the Electrical Supply Company; J. A. Fowler, of the Joseph Fowler Electric Company; C. B. Rutledge, of the Bluff City Electric Company, and H. G. Street, of the Memphis Electric Company.

The foregoing are but a few typical examples of the preliminary activities already under way in scores of cities and towns all over the country.

An Appropriate Christmas Window Display

The Fundamental Principles of for Appropriate Displays During Note That Every Device Shown

MUCH has been said and written about window displays for the electrical dealer, about the necessity of good displays frequently changed, the desirability of motion in a display, the co-ordination of various forms of advertising with window displays, and similar points that go to make up this important part of merchandising. Most of the articles that have appeared on the subject have implied that the majority of dealers do not use their window space to good advantage and go on to tell what should be done. Undoubtedly there are a number who are wasting opportunities of this kind and who need to be told what to do. However, there are many electrical dealers throughout the country who realize fully the utility of good displays and who know enough about them to give lessons to others.

Illustrating Color Effects and Illumination.

This window was trimmed entirely in white and red. At night it was illuminated with blue lamps. Behind the background of the display were blue lamps which reflected a very brilliant color on the Santa Claus sleighs represented as traveling through the clouds.

Effect of Drapery and Steps.

The drapery at the back and sides of the display shown was of white velvet. The background and steps were covered with delicate shades of red and green, and the decorative lamps were also red and green. Above the background and reaching to the top of the window frost-covered foliage was used for decoration. Poinsettias of red and white were arranged at irregular intervals throughout the display.

It is unfortunate that much of the material written on the subject is misdirected. Those who need to be woke up and who would benefit by instruction somehow do not find time to read or do not act on the suggestions, while those who are familiar with the subject are the enthusiasts that study it deeply, know all the fundamentals of window trimming as well as the tricks of the trade and do not profit greatly by the articles that appear from time to time.

Still, window display is a subject worth hammering on. The value of a good display as a sales producer cannot be emphasized too strongly, and every dealer should at least know some of the principles of the art. Especially is this true during the holiday shopping season, for the merchandiser of electrical goods must use window space as a lever in meeting the competition of dealers in other lines.

The dealer must rely on some kind of publicity to secure new customers. And of the different methods of attracting attention, the window display is the most effective because it reaches the most people, and at the least expense.

The fundamental rules of good display cannot be escaped. There are three requirements necessary, namely: Power to attract attention, to create sales, and to make a favorable impression. Let us consider some points of good practice in trimming a window.

Of greatest importance is the illumination, which should come from reflectors placed in a concealed position. Unshaded lamps detract from the goods shown. Backgrounds for the window space are necessary to keep the attention of the observers on the display itself.

It is well to show a single line of goods at a time, thus simplifying the scheme of display and producing a greater impression. Related lines of goods may be shown, but a multiplicity of articles of different kinds produces no lasting effects.

Frequent changes in a display are absolutely necessary.

The arrangement of the goods to be exhibited should never be flat; that is, on

One of the Greatest Merchandising Assets

Window Trimming—Suggestions the Christmas Shopping Season—Has a Price and Descriptive Card

levels from the floor to the observer's eye, accomplished with steps or pedestals. A display must be balanced; that is, the distribution of the articles must be made so that portions of the display do not overshadow the remainder, or if they do it must be in the correct proportion so that the equilibrium will be maintained and one portion will not obtain any more attention than the other.

Moving elements are exceptionally good for attracting attention. The dealer's stock of motors or lamps should be called on to provide this display asset.

Drapery plays an important part in dressing a window. Plush and crepe paper are usually used, the former being the most satisfactory. The best colors for showing off electrical goods are red, green and purple.

Without price, descriptive, or catch cards the show window is a very silent salesman. Price cards on all articles are considered necessary by some dealers, and it is good practice. Descriptive cards, attractively prepared, are used for calling attention to usefulness, quality, etc., of certain electrical devices not altogether familiar to the general public. Catch cards have the greatest application in giving a display a note of timely interest.

Exhibits consisting solely of merchandise, even though they are properly arranged, do not possess great drawing power. There are exceptions to this rule, however, such as a display of electrical household appliances, toys, or Christmas-tree lighting outfits during the holiday season, or electric radiators in the fall.

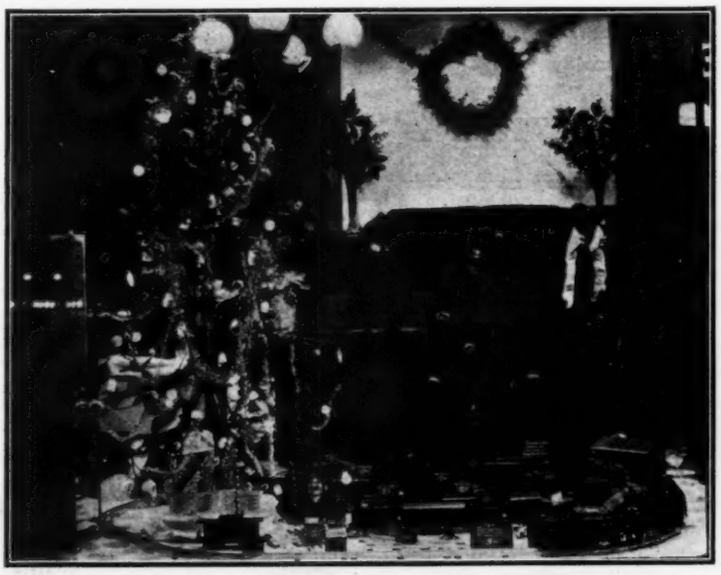
The best window displays are those that convey some idea, some meaning, to the observer. Various forms of representation are employed to put the message of the display across. It may be a selling idea such as the novelty and practicability of electrical goods for Christmas gifts or the convenience of the electric flat-iron. Or the message may be stated in a seasonable form, such as an election-day or a Thanksgiving-day window display. The scheme of a display may also be a purely decorative one in which the idea conveyed is of local or national interest.

Any of these displays that convey a meaning is interesting to the public and net results far greater than a simple display of merchandise. They call for originality and usually more time and expense, but this is returned in increased sales and the popularity gained by the store making them. No one who is interested in trimming windows and is enthusiastic about good display can refrain from attempting to make a display that is something more than a mere exhibit of goods.

The presentation of wares in window space is an art which cannot be studied too much, and with which the electrical dealer should become quite familiar. The function of the window display is to sell goods, and it should be made to do its part in the merchandising plan.

A Display of Decorative Value.

The border at the top of this window represented a child's circus parade of animals. The background was made of white felt on which was placed green felt cutout evergreen trees, which were covered with diamond dust. The balance of the drapery was entirely of red and white plush.



A Moving Element Combined with an Idea.

An old-time fireplace, with andirons and similar articles, was used in connection with the tree to present the Christmas idea. The foreground is composed of a display of electrical trains and toys, one train being kept in operation during the day. The Christmas tree was illuminated with numerous fancy and colored lamps. The floor was covered with painted canvas to represent tiling.

Poor Service Causes Municipal Ownership

Customers of a Public Utility Demand and Are Usually Willing to Pay for Good Service and if the Private Company Does Not Give It Municipal Ownership Is Considered the Alternative

By GLENN MARSTON

NEXT to lack of knowledge about rates, the most prolific cause of municipal ownership is real or fancied inadequate service, and often it is very real. It is not strange that the people of a community where voltage is irregular and interruptions frequent should want to improve these conditions. If they get no satisfaction from the company they naturally turn to municipal ownership as a means of attaining their end.

They do not believe statements made by the company that a municipal plant cannot succeed because of a division of the business. They are firmly convinced that the municipal plant will give such good service that the company's customers will change over, and that the municipal plant will get all the business. And history shows us that this very thing sometimes very closely approaches consummation.

If a municipal plant is installed because of the poor service rendered by the existing company, the company then must improve its service or lose its business. Money must be spent on improvements and betterments at last—why is it that so many companies do not make these expenditures until the management is slugged over the head with a ballot-box? It is simply short-sighted, penny-wise, pound-foolish policy.

It is seldom that the live, aggressive company is threatened with municipal ownership. True, there is no company so good as to be free from the raids of self-seekers of one kind or another, but when such people start agitation it is exceptional to have them develop into serious movements against a conscientious company. When an agitation for municipal ownership starts, it is time for the company's management to take stock of its short-comings very seriously, and not to rest until the trouble is discovered and remedied. It must be remedied some time, and the more quickly it is done, the better it is for all concerned.

Interruptions to Service Should Be Guarded Against.

Take interruptions, for example. No company can ever hope to be utterly free from them. An irreducible minimum is all that can be expected, and it is all that the public expects if it is convinced that the company is sincerely doing its best. While freedom from interruptions is impossible, it is possible to prevent a repetition of interruptions from the same cause time after time. There was a case in the middle West a few years ago where the public was in a frenzy against the company. There were interruptions day after day, voltage was irregular, and the management was indifferent to complaint—apparently indifferent, I should say, for every complaint was investigated, without, however, making a report to the complainant. Rates were only a trifle higher than rates in surrounding territory, but the quality of service made any rate at all seem high.

The people naturally clamored for a municipal plant, and voted for it, too, just as soon as they got a chance. Fortunately there was some delay in carrying out the plan for a municipal plant, and in the meantime the company changed materially for the better. The main trouble here was not with the management of the company, but with the banking house back of the company. In an effort to save every possible penny on construction, the work had been done skimpily throughout. The system was just capable of handling business under normal conditions. The moment something out of the ordinary occurred there was trouble. If it had not been for this original skimping, there would not have been the complaints there were, nor would the operating staff have always been so busy keeping things in shape that they did not have time properly to handle complaints.

The operators were in a perilous position. They had to keep down operating expenses, which were naturally high in percentage, they had to keep the plant going as best they could, they had to try to please the public, and yet they could not tell the people that the bankers were skimping, and that was the bottom of the trouble. It is difficult for a manager to choose between an angry customer and an angry banker. Both are too necessary to his business.

In the end the bankers had to come across in order to protect the property; but the same amount of money spent a year before would have produced infinitely more return. When the money had been asked for before, the bankers said they could not get it—but when they had to get it, it was there. The transmission lines were rebuilt, the distribution was remodeled, new transformers were put in, new generators went into the station, and the whole property was put into first class condition. Today the people of that city do not need a municipal plant, but it would be difficult to convince them that their talk of municipal ownership, and their votes for it, were not the chief cause of the satisfactory service they are getting today.

Frequent interruptions are not necessary. Many companies do not have them. When interruptions are too frequent—so frequent as to arouse public notice—it is time to find out who or what is responsible, and get rid of the cause. Maybe it is only a slipshod engineer at the plant, and maybe it is the banker, but the cause must be eliminated. When an interruption does occur it can be turned to advantage by getting the papers to discuss it as an example of what the city used to be like before there was electricity compared with what it is like now. Let the interruption be a demonstration of the value of your service.

There is also sound psychology in being glad the interruption was corrected so quickly instead of being sorry it lasted so long. When an interruption occurs a full explanation should be made public at the earliest possible moment, with a description of the steps being taken to prevent a recurrence of the trouble. People will forgive a company for being struck by lightning, but they must be told about it when the lightning happened to be on a line 15 miles away. In fact, there are people who would be glad if the electric plant shut down every time a thunder storm occurs.

Utility Must Keep Pace with Growth of Territory.

Nor can a community be blamed for wanting municipal ownership if the city has grown while the company has not. There is no objection to the common ownership of gas and electric plants as long as each is permitted to serve the public properly, but trouble is brewing when a gas company buys an electric plant and then fails to

make improvements or extensions for 10 years or more, in order that the public will be favorably inclined toward gas. A case of this kind recently came up, and the company was faced with the alternative of having aggressive municipal competition or of having to rehabilitate its own electric plant and make it of real service to the public.

It would seem that the fallacy that gas and electricity are natural enemies should have been exploded long years ago, but it has not, and there are owners of combination properties today who not only neglect one end of the business but actually hold it back while promoting the other. It is to be expected that a gas man will push the gas end of a combination property or that an electric man will push the electric end, but it is too much to expect customers to quietly submit to being told that they should use gas when they ask for electricity. It is not difficult to see that a new electric plant might be contemplated when the existing company extends its gas mains, but refuses to extend its electric distribution on the ground that gas is already available and that therefore electricity is unnecessary.

Such a condition occurred and was complicated by a demand that electric rates be reduced, and the people were only induced to vote against the proposition to build a municipal plant by the promises of the company to build extensions and make rate reductions which were heartbreaking. The whole agitation came about because the public was not being properly served, and probably would not have occurred if the company had been even reasonably progressive in its electric department, making slight reductions in rates as the volume and condition of business warranted them, instead of waiting until a 30 per cent reduction was given in order to stave off the construction of a municipal plant.

An Interesting Case.

I was once called into a city of 15,000 inhabitants to save the company from municipal competition. I found rates of 13 cents per kilowatt-hour, and no day service except from the trolley line for power! Surely the people of a city of such size might at least have expected day service, and I firmly believe they should have been satisfied with the rate if they could have only had light when they wanted it. During the printing of the newspapers in the afternoon the presses would stop while the trolley went up the hill every 20 minutes! And the papers were powerful molders of public opinion. It is not going too far to say that they would have welcomed any improvement in conditions, even though they felt that municipal ownership was not as good as promised.

This company had not kept up with the times, nor with its town. Its equipment was ramshackle and old, it gave only night service at high rates, it made no effort to meet the public half-way in doing business. It simply muddled along with enough revenue to pay its interest. It was enough to make one weep to see the neglected opportunities for the use of electric light and power in this city. And yet there seemed to be no offer of outside competition. In some way the entrance of competing companies had been discouraged in recent years, though the company itself was composed of a number of one-time competitors. The people needed relief, and they had decided to get it themselves. Eventually the municipal-ownership plan was abandoned, but only after much scurrying around by the company to put its house in order and give the people the service which the size of the place justified. The old management had to get out, and new owners took hold. They made something of the property, and it is now the original and central unit of an extensive group which is giving good service at reasonable rates and making money doing it. Apparently municipal ownership agitations have their advantages as well as their perils.

Poor Service Inexcusable.

Poor service seems always due to carelessnes or parsimony, and the responsibility may lie on anyone from the fireman up to the financier. It is not unusual that a manager, in a very laudable effort to keep down operating expenses, will go too far, and keep his costs down below a point where good service can be rendered. The shortsightedness of such a procedure is so obvious that it is surprising how often it occurs. There is no builder of new business effective as good service, particularly if it is well advertised. Without it new business must necessarily be slow if not stagnant. The cost of good service is well repaid by the added business which comes with it.

I have been in places where people paid high rates for good service without a murmur, and in near-by towns, where the rates were low, the company was constantly subject to attack because it was not delivering the goods. It is self-evident that a company with low rates and the small volume of business which comes with poor service cannot be as profitable as more costly service in greater volume at the same rates. So much of the success of the central-station business depends on volume of output that it is surprising economies are allowed which bridge the chance of greatest output.

If the banker has put in a cheap plant, he should be made to understand that the public will not indefinitely tolerate the service which a cheap plant gives. If the manager is trying to cut operating expenses too low, he should take counsel with himself before he has his shortcomings called to his attention by impatient customers. If the linemen or station employees are careless, the responsiblity also lies with the manager, and can be corrected by him. It is certain that poor service cannot be given permanently, and it is better for the central-station industry that improvements be made voluntarily, and with credit to the companies, than that they must be forced from an apparently unwilling management.

Personality of the Company.

In this discussion of service I have not taken up that indefinable element of personality which is essential to the giving of really good service by a company. It must be considered. Politeness and courtesy are just as important as steady voltage and uninterrupted supply. The public takes an interest in electricity if it is given half a chance. It has a fascination that few other industries possess. The central-station manager deals with a public which is willing—nay, anxious—to interest itself in his product. But in proportion to the mystery of electricity is the difficulty of making the people feel at home with it, and the first step is to make them feel at home with the producers of this mystic form of energy. That is a part of service, and a highly important part.

Establishing the personality of a corporation is no easy thing, and there are no set rules as to how it should be done. Yet it is frequently because of personality in its advocates that municipal ownership gets such a grip on the minds of the people. Nobody ever heard of a spontaneous movement for municipal ownership. The movement always is promoted by some personality, and unless it has that personality behind it it does not get very far. And the corporation which does not develop a personality—not necessarily the personality of any one of its officers, but a composite of all the good that can be taken from each employee—can never make the most of its opportunities. The loan of fans to sick persons is an evidence of corporation personality. So is the quick and pleasant adjustment of a questioned bill. So is the reading of a meter, for that matter. Every time the company comes in contact with the public it should give evidence of personality. When this is attained, and the wheels go round smoothly and steadily, there will be little to fear.

Abstracts of Illuminating Engineering Society Lectures

Church Lighting

By E. G. PERROT

ANCIENT practice resulted in the general use of the candelabra, which is still retained on the altar. Art is conventional and symbolic and in church lighting the symbolic element is of more importance than the utilitarian. In evangelical churches, the lighting problem is similar to that of the auditorium. Direct, indirect or semi-direct fixtures may be used, but chandeliers should be avoided on account of the resulting glare. Cove lighting and skylights are often applicable, but semi-direct units are probably the most popular.

In ritualistic churches, it is necessary that the lighting should be high upon the altar, but dim and mystic elsewhere in the church. Decorative lighting must also be available and candles are necessary upon the altar. Different systems of lighting are applicable in different cases and various examples were cited to illustrate these, including cornice lighting, outlining and the gas lighting in the Philadelphia Cathedral of Saint Peter and Saint Paul. Lantern slides were used to show the different effects obtained in churches of different types.

Lighting of Yards, Docks and Other Outside Works

By J. L. MINICK

RAILWAY service presents a wide variety of applications of lighting, which involve each type of lamp available. Some of the problems are common with other fields of lighting while some are peculiar to this work. But few tests have been made as to necessary intensities and hence data are not available. But few of the railroads have men sufficiently trained in this work to solve their problems.

The newer freight yards at railroad division points have tracks on a grade to make use of gravity in shifting the cars, and the work is continuous day and night. Lighting must be provided which will permit this and high intensities are needed for weighing cars and inspection. At the hump in front of the weigh scales a lamp is usually mounted 30 feet high and at least ten feet from the center of the track. A 500-watt gas-filled lamp with a distributing reflector shielded from the weighmaster is satisfactory at this point. General brightness is increased by strewing the ground with oyster shell or some similar material. Arc lamps are usually unsatisfactory on account of unsteadiness. The weighmaster must work rapidly and conditions for seeing must be as good as in daylight. Usually several 250-watt incandescent lamps with reflectors are mounted on the side of the scale house. These should have a distribution giving the maximum intensity at an angle of 45 degrees in the horizontal plane and 90 degrees in the vertical plane. Oil lamps and flame arcs have been found unsatisfactory for this work. A spot light is usually used to illuminate the end of the rail on the platform. For the scale beam, three 25-watt or 40-watt lamps are mounted seven feet high. For inspection of the scale mechanism in the vault, spot lighting of the important parts is supplemented by portable hand lamps.

In the classification yard, high illumination of switches is necessary. Lamps may be mounted 35 feet high with a distribution giving high intensity in the zone from 45 to 60 degrees. Pole spacing must be not more than 200 feet and on curves less than this. Yards must usually be lighted from the sides and units giving a wide distribution with a maximum slightly below the horizontal are desirable. For the pull-out yards, arc lamps upon a series circuit are largely used, the magnetite unit with prismatic refractor being favored. Mercury-vapor lamps have also been used. Searchlights are objectionable. At platforms where package freight is handled, 100-watt incandescent lamps, placed 20 feet apart and 10 feet high, in the middle of the platform, have been found satisfactory. To light car interiors, portable lamps should be available with plug connections.

In docks and terminal yards, an intensity of 0.75 to 1.25 foot-candles is sufficient except at points where manifests must be read. Where docks are roofed, the problem is simple. In open yards used for storage, where loading is often done with cranes, the problem is more difficult. Portable standards supplied from underground cables have not proven satisfactory, and the initial cost is very high. Passenger platforms at terminals should be supplied with about 1.25 foot-candles. Metal or glass reflectors with a mounting height of 20 to 22 feet are suitable. At way stations, distributing reflectors with 25 or 40-watt lamps mounted 9 feet high are recommended. One foot-candle is sufficient.

While there is a field for all types of illuminants, in railroad work the following is good practice: (1) Incandescent lamps are preferred to arc lamps. (2) Large units are generally preferred. (3) Inside stations, glass reflectors are preferred; in shops, aluminum reflectors; and outdoors, porcelain-enameled reflectors. (4) Lamp filaments should be shielded, the angle of cut-off of reflectors being about 70 degrees. (5) Equipment should be as strong as possible, consistent with cost.

COMMERCIAL PRACTICE

New-Business Methods, Policies, Rates and Kindred Central-Station Matters for the Man Engaged in Selling Electricity

Scholarship a Reward for Novel Window Display.

During "Dress-up Week" at Lowell, Mass., the early part of October, the Lowell Electric Light Corporation entered a prize contest for the best window trim, and won first prize in its class. The display consisted of a scheme which called attention to "Gifts for the Bride," in which a wax figure of a young woman, veiled and carrying a bouquet, was the center of lines of white ribbon streamers which extended in all directions to handsome domestic appliances suitable for wedding gifts. R. G. Custer, who was chiefly responsible for the successful production, was awarded a scholarship offered by the International Correspondence School, and will take its course in advertising and window trimming.

"The House Beautiful" at the Chicago Home Exposition.

Exceptionally artistic, inviting and convincing was the "House Electrical," the exhibit of the Commonwealth Edison Company at the third annual Home Exposition at the Coliseum, Chicago, on October 18 to 31. This house was a three-room structure with a porch fronting on a lawn. At the west end of the lawn was a garage with an electric automobile shown entering it. On the lawn was an electric fountain. Another ornament of the lawn was a bird house with electrically illuminated glass "canaries."

The house was divided into a living room, a dining room and a kitchen. Each of these rooms was handsomely or appropriately furnished with all kinds of electrical comforts and conveniences, including electric lighting, electric portable lamps, electric heating and cooking utensils and an electrically operated refrigerator.

The exhibit was unusually attractive and a credit to the company. The Commonwealth Edison men mainly responsible for it were Dana H. Howard, superintendent of the Advertising Department, and W. P. Lyon, estimating engineer of the Contract Department.

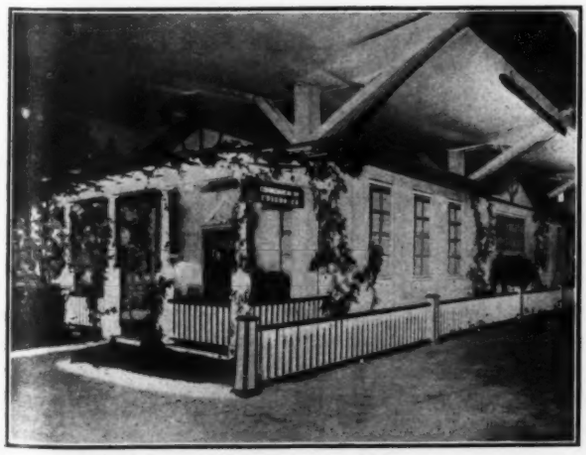
Electric Rates Lowered in Brooklyn.

A reduction of rates for electric energy by the Edison Electric Illuminating Company of Brooklyn from a maximum of 11 cents a kilowatt-hour to 8 cents has been ordered in a decision of the New York Public Service Commission. The Commission directs the company to reduce its present retail lighting rate of 11 cents to 8 cents for the first two kilowatt-hours average daily use per month, from 8 cents to 6 cents for the second two kilowatt-hours average daily use per month, and retains the present rate of 4 cents for the excess use over four kilowatt-hours average daily use per month. The company is also directed to reduce its retail power rates from a maximum of 10 cents per kilowatt-hour to 8 cents per kilowatt-hour. Changes are ordered in the method of computing maximum demand.

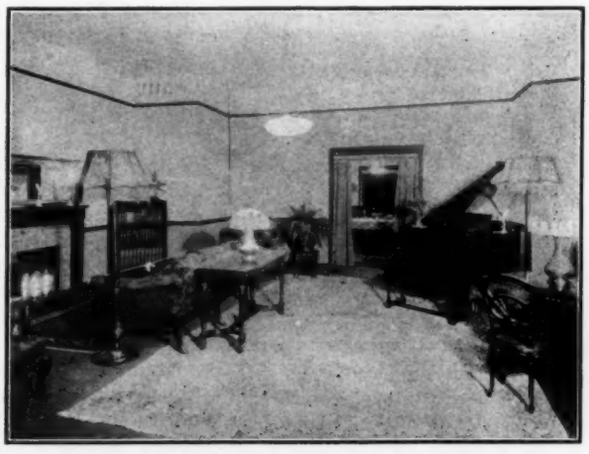
Lamp renewals and installations are to be charged at one-half cent per kilowatt-hour, but the company must furnish instead of carbon lamps, which it now furnishes free, tungsten lamps or lamps of equal efficiency, which the opinion holds will result in an increase of the lighting efficiency of from 200 to 250 per cent.

The decision will result in lighting consumers having their bills reduced on the average by 25 to 30 per cent, while retail power consumers should have a reduction on the average of 6 per cent, and power consumers who use current at the maximum rate by 20 per cent. The minimum of $1 a month for service charged against consumers is left undisturbed, but the charge must be credited against consumption of current where such consumption exceeds $12 per year.

At the hearings in the case, which have consumed about four years, the Edison company claimed a valuation of $38,800,000 on its property, exclusive of franchise and going value. The Commission allows approximately $22,000,000. At the new rates fixed by the Commission it is estimated that the company will have a return of seven per cent. At the same time it is estimated that the annual saving to the retail customers will be about $1,100,000. The opinion in the case was written by Commissioner William Hayward.



House Electric of Commonwealth Edison Company.



Interior of Living Room in House Electric.

Oklahoma Company Breaks Output Record.

Electric energy output of the Oklahoma Gas & Electric Company for the week ending October 21 amounted to 291,230 kilowatt-hours, a gain of 23 percent over the corresponding week of 1915, and is the largest one week's output in the company's history. This output was reached with a maximum peak of but 3,713 kilowatts, whereas during the largest previous week's output of 279,550 kilowatt-hours the peak load was 4,236 kilowatts. Recently the company has taken on several valuable pieces of business and during the week ended October 21 contract was secured covering 48.5 horsepower in motors at the new wholesale house of Williamson, Halsell & Frazier, making a total of 76.5 horsepower now used by this concern. Contract has been secured with Russell Jobbers Mills for 25 horsepower in motors. Improvements are being made which will double the capacity of the American Brick & Tile Company's plant. When completed the connected load at this plant served by the Oklahoma Gas & Electric Company will be increased from 135 to 165 horsepower in motors.

Making Good Use of a Basement Show Window.

One of the problems in merchandising electrical goods is to take full advantage of the potential power to attract attention of the show window. This is true even where the merchandiser has the advantage of a good business location, an attractive front and window space of liberal proportions. Considerable credit is therefore due the Empire Gas & Electric Company, of Geneva, N. Y., for the display shown in the accompanying illustrations. As will be observed, the show window of this company is below the street level and not particularly appropriate for the usual display. However, the company capitalized on this feature by arranging a window display of a washing machine, laying emphasis on the view which the observer would get of the interior of the machine.

Arrow Sign Directing Attention to Basement Window Display.

The washing machine was mounted on a revolving platform, and, at a certain point in the revolution, the circuit of the motor on the washing machine was complete and the cylinder would revolve. Passersby could readily see inside of the washing machine cylinder.

An electric arrow sign was installed to direct attention to the window. The management claims that the display created much favorable attention and resulted in numerous sales.

Window Display with Revolving Platform.

In some of its other offices the company used the same display, and where the bottom of the window was above the street level a mirror mounted at an angle of 45 degrees was used so as to give a good view of the interior of the washer.

Liability of Electric Power Company for Cutting Off Current.

What is the duty of an electric power company in case of fire? An interesting and novel case involving this point arose in that of Mullen versus Otter Tail Power Company (130 Minn., 386). The electric light company under contract with Mullen, a merchant, supplied electric current to his store. A fire broke out in a restaurant in the rear of Mullen's store and separated from it by a solid partition. The electric light company cut the wires supplying the electric current to the store, and Mullen, by reason of the darkness, was unable to remove his stock and fixtures. He thereupon instituted suit against the company to recover the value of such of the stock and fixtures as were damaged and destroyed.

The court held that the company had the right to sever the wires that supplied the electric current to the store, providing it was reasonably necessary to do so in order to save loss or damage to its property. However, the company had no such right until it became reasonably necessary. It could not arbitrarily refuse its customer service, especially at such a time. It owes its customer a legal duty not to deprive him of light until protection of its own interests, or the safety of the public, made it reasonably necessary to do so. The company, having severed the wires forty minutes before there arose a necessity for such action, deprived its customer of the light necessary to save his property, thus creating a breach of the company's duty to its patron.

From this decision, it is rather difficult to frame a rule of action for electric light companies in similar cases.

Slogan Contest in Louisville Enhances Newspaper Advertising.

What the Louisville (Ky.) Gas & Electric Company regards as the six best reasons why old houses should be wired for electric lights are being carried in a current advertisement the company is running, that in the main is an invitation to occupants of non-wired houses to compete in suggesting a slogan. The company, of course, could make use of a slogan with a good punch in it, which conveys the value of electric lighting in the home, but the contest is designed principally to interest those whose homes are without electric lights and to acquaint them with the advantages of electricity. The response to the contest has been large, showing furthermore that the information set forth in the advertisements has been well and carefully read. Prizes for the contest, which runs until December 1, are $25 for the best slogan, $10 for the next best and $5 each for the three next in order. The purpose of the contest is principally to secure variety and maintain interest in the advertisements of the company, which run regularly in the various Louisville papers. In outlining the plan of the contest the company lists the six best reasons for house wiring in the way of suggestions to contestants.

The reasons, each backed up by an instance to bear out the statement, are as follows: (1) Money invested in house wiring pays 25 per cent. (2) Wired houses sell for more. (3) Electric wiring is "Tenant Insurance." (4) Electric service is economical. (5) Electric light is convenient. (6) Electric light lessens the fire hazard.

Here's $25 for Somebody And $25 More for Four Others

We need a **snappy, expressive, advertising slogan,** which conveys the value of Electric Lighting in the Home.
We are willing to pay for it, and offer the following prizes:

For the Best Slogan . . . . . $25.00 in Gold
For the Second Best Slogan . . . $10.00 in Gold
For the Next Three Best Slogans (Each) $5.00 in Gold

Any occupant or owner of an unwired house in Louisville may compete and may send in as many suggestions as he or she desires.
The slogans submitted are to be judged by the Advertising Department of the company.
In case any slogan selected has been submitted by two or more contestants, there will be no division of the prize, but the full amount will be paid to each.
Employes of the Louisville Gas and Electric Company and members of their families are not eligible to compete for the prizes.

Children's Slogans Are As Welcome As Their Elders'
The following suggestions are offered to assist you in preparing your slogan:

1st. Money Invested in House Wiring pays 25%.
A four-room cottage wired complete with handsome chain pendant fixtures and Mazda lamps at a cost of $24.00 may be rented for 50c more on the month; six-room houses at a cost of $35.00 may be rented for 75c more per month; and eight-room houses at a cost of $48.00 usually bring $1.00 per month—that's 25 per cent of the investment.

2d. Wired houses sell for more. Homeseekers want modern conveniences.
A Louisville real estate firm had for sale two houses, built side by side, exactly alike, except that one was wired. The wired house was priced at $250.00 more than the other. It was sold first, and the wiring cost less than $60.00.

3d. Electric wiring is "Tenant Insurance."
The loss of rent occasioned by a house standing vacant for two months will usually amount to the cost of wiring it. Many houses stand vacant for more than two months because they are not wired.

4th. Electric Service is Economical.
Many modest homes in Louisville are supplied with Electric Service at a monthly cost as low as 50 cents (12 cents a week), probably as cheap as coal oil, and perhaps less than the cost of gas mantles and chimneys broken where gas lighting is used.

5th. Electric Light is Convenient.
At the snap of a switch Electric Light floods the room—no groping in the dark for matches. Electric light may be placed in any position and shaded as you desire.

6th. Electric Light Lessens Fire Hazard.
The reports of the origin of fires prove the above statement. It is not necessary to have matches lying around when you use electric light.

7th.
Houses are wired on the twelve-months-to-pay plan for the above cash prices, plus 10 per cent.

This is a sample slogan in rhyme:
Electricity Paves the Way
For a Happier, Healthier, Easier Day.
And here is one in prose:
Electric Light Puts Joy in Living.
Both these slogans have faults—but serve to illustrate what we mean by a slogan. Your slogans may be in either rhyme or prose, but to secure attention must be short, catchy and appear well in a newspaper advertisement or on a bulletin board.

Contest Closes December 1
Awards will be announced during the Electrical Exposition, December 4-9.

LOUISVILLE GAS & ELECTRIC COMPANY
Incorporated.
Telephones 2182. 311 West Chestnut St.

Advertisement of Louisville Company Announcing Slogan Contest.

Merchandising Methods of Narragansett Company Productive of Noteworthy Results.

An interesting delineation of the methods used by the Narragansett Electric Lighting Company, Providence, R. I., in building up its appliance business, was given before the New England Section Convention, N. E. L. A., at Pittsfield, Mass., recently, by A. H. Allcott, in charge of the appliance shops.

The speaker urged the selection of merchandise of quality rather than cheapness, and believed it desirable to stock only one make of appliance of each variety, for the following reasons: First, because the purchasing power is limited on each line, with discounts and profits correspondingly limited, if several makes are carried; and second, because it is harder to sell several makes shown together, this practice resulting in confusing the customer. A further reason is because repair parts can be handled to better advantage with a single line than with several, and there is less dissatisfaction over the different styles of cords and plugs.

Regarding the standardizing of appliances, Mr. Allcott pointed out that, it being to the company's advantage to make it easy for customers to use appliances, efforts should be made toward standardization as being conducive to this end.

The electric shop should have an air of merchandising, and not be too richly garnished with marble counters and mosaics, which give the impression of too great expensiveness in the goods proffered. Purchasers like to handle the merchandise in which they are interested, so showcases have a very limited usefulness. Losses due to dust and handling would easily be balanced by greater facility of sale.

The window, said Mr. Allcott, is the feature on which greatest attention and money are expended. It works 24 hours a day; hence the importance of making it effective. The better practice is to arrange them with a background, rather than having them open, because more tasteful arrangements are possible and because open-backed windows distract attention from the exhibit.

Show windows should be redressed weekly, but special considerations, like a hot spell, holiday, etc., may make a change desirable oftener. Moving displays attract unusual attention.

The uses of the goods shown should be told by clear and succinct signs, and appliances should be grouped to "tell a story" of their place and function in the home. There are many original ways in which this feature can be carried out to the best advantage.

Store service is of three parts—sales, delivery and upkeep. Prompt repairing is of equal advantage to the company and the customer.

Merchandising on easy terms is found worth while at Providence, where all appliances retailed at over $10 are sold on the monthly part-payment plan, only excepting fans and tungsten lamps. Since the adoption of the easy-payment idea, sales have grown more than at the usual ratio of increase.

Payments are strung over 12 months. The purchaser signs a lease form which gives title only at the last payment.

Practically all goods are sold at manufacturer's list price. During 1915, 895 portable lamps were sold, with a gross profit of 50 per cent; 375 vacuum cleaners were sold in three months, total sales being $10,375, gross profit being $2,575. Terms were $2.50 down and $2.50 per month. Prior to this "drive," only 400 were sold in two years.

Daily newspaper advertisements are found the best publicity medium. Five per cent of gross receipts of the previous year are spent for advertising of all kinds. The appliance department has begun to show a profit balance.

ELECTRICAL CONSTRUCTION

A Department Devoted to Problems Relating to the Installation, Operation and Maintenance of Electrical Equipment

THE THEORY OF THREE-WIRE DISTRIBUTION.

By Terrell Croft.

The three-wire system is used because it saves copper. (See Figs. 1 to 4.) Incandescent lamps for 110 volts—more or less—are more economical and efficient than those for higher voltages. A circuit carrying any considerable load and operating at the low pressure of 110 volts would require very large conductors to keep the line drop and the power loss in the line within reasonable limits. With the three-wire system, a low

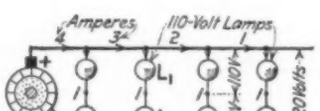


Fig. 1.—110-Volt Lamps Arranged in Multiple-Series Across 220 Volts.

voltage, say 110, is impressed on the receivers—incandescent lamps—while one twice as great, say 220, is used for transmission. Since the weight of the metal in conductors for a given power loss varies inversely as the square of the voltage, it is

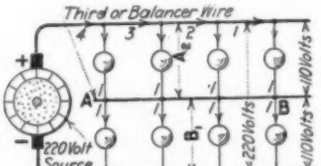


Fig. 2.—Balancing Wire "AB" Arranged Between Lamps.

evident that a considerable saving in conductor material is possible with the three-wire system. In this country the three-wire system is of greatest importance as applied to 110-220-volt lighting systems.

The principle of the three-wire system is illustrated in Figs. 1 to 4. Incandescent lamps for 110 volts could be connected two in series across 220 volts as shown in Fig. 1, and while each lamp would operate at 110 volts, the energy of the group would be transmitted at 220 volts, and the outside conductors

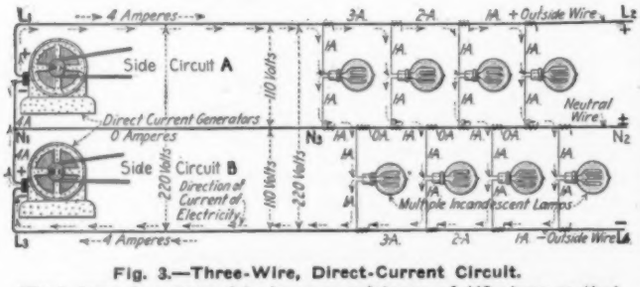


Fig. 3.—Three-Wire, Direct-Current Circuit. (Each lamp is supposed to have a resistance of 110 ohms so that it passes 1 ampere when 110 volts is impressed across it.)

could, with equal loss, be but one-fourth the size that would be necessary if the energy were transmitted at 110 volts. This

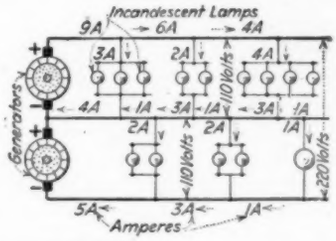


Fig. 4.—Showing the Distribution of Current in a Three-Wire System.

arrangement (Fig. 1) while it would operate, is not commercially feasible because each lamp (of each pair of lamps in series) must be of the same size and if one lamp—L_1, for example—goes out, its partner, L_2, is also extinguished. These disadvantages might be partially corrected by installing a third or balancer wire as at Fig. 2. Then one lamp might be turned off and the others would burn. Also, a single lamp might be added to either side of the system, between the third wire and either of the outside wires. But unless the total re-

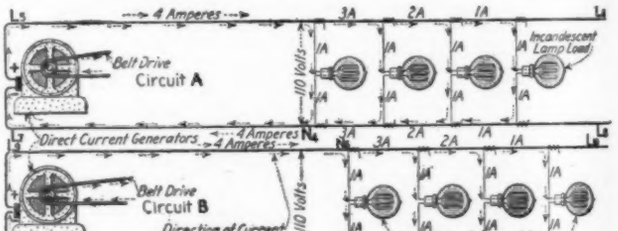


Fig. 5.—Two, Two-Wire Direct-Current Circuits.

sistance of all of the lamps connected to one "side circuit," A_2 was nearly equal to that of all of the lamps connected to the other "side circuit," B_1 the voltage across one side circuit would be higher than that across the other. On the side having impressed on it the higher voltage the lamps would burn brightly and on the side of the lower voltage they would burn dimly. Obviously, it is not feasible in practice to so arrange or "balance" the side circuits that they will have the

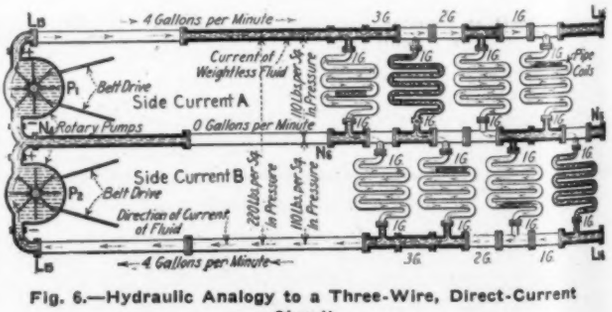


Fig. 6.—Hydraulic Analogy to a Three-Wire, Direct-Current Circuit.

same resistance. Hence, some other method must be used in practically three-wire systems whereby the electricity will be transmitted at, say, 220 volts, and the pressure across the lamps will be, say, 110 volts.

Commercial three-wire systems consist (Figs. 3 and 4) of: (*a*) two outer conductors (L_1—L_2 and L_3—L_4, Fig. 3) having, for lighting installation, a pressure of 220 volts impressed

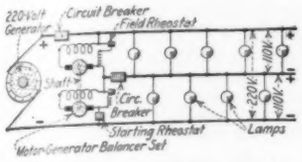


Fig. 7.—A 220-Volt Generator and a Motor-Generator Balancer.

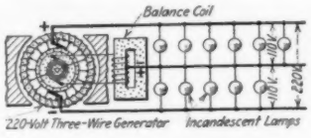


Fig. 8.—Three-Wire Generator.

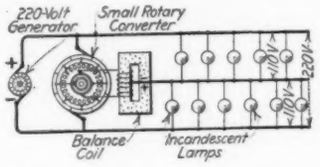


Fig. 9.—Small Rotary Converter Used as a Balancer.

across them; and (*b*) a neutral wire (N_1—N_2) so connected to sources of voltage that the pressure between it and either of the outside wires is 110 volts. In Fig. 3, direct-current generators are the sources of voltage. The neutral wire joins at the point, N_3, where the generators are connected together. When the system is perfectly balanced, the neutral wire carries no current and the system is then, in effect, a 220-volt system. Perfect balance seldom obtains in practice. When the balance is not perfect, the neutral wire conveys a current equal to the difference between the current taken by one side circuit and that taken by the other side circuit. Note from Fig. 4, that the current in different parts of the neutral wire

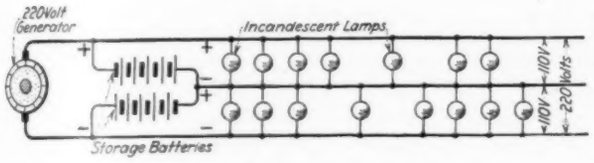


Fig. 10.—A 220-Volt Generator in Combination with Two Storage Batteries for Obtaining Three-Wire Voltages.

cause the three-wire circuit is "balanced." With the arrangement of Fig. 3, one less wire is required than with that of Fig. 5. Now, the current in the "outer" line wires is four amperes, both in the three-wire circuit of Fig. 3, and in the equivalent two two-wire circuits of Fig. 5.

However, in Fig. 3 the four-ampere line current traverses only half the length of line conductor that the four-ampere currents in Fig. 5 traverse—because no, or almost no, current flows in the neutral wire. Hence the line wires in Fig. 3

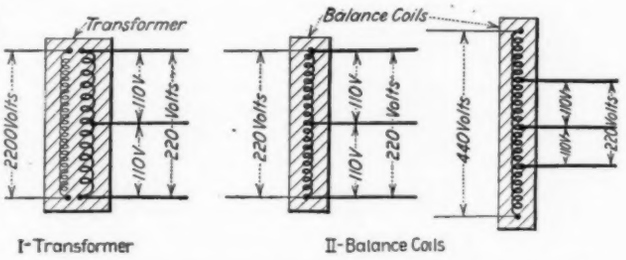


Fig. 11.—Methods of Obtaining Three-Wire Voltages With Transformers and Balance Coils.

may be of different intensities and that it is not necessarily in the same direction in all parts of the neutral wire. Each incandescent lamp in Fig. 4 is assumed to take one ampere and the small figures indicate the currents in different parts of the circuit.

A three-wire circuit may, in a sense, be considered as a combination of two two-wire circuits. Thus, the two circuits of Fig. 5 would transmit the electrical energy to the eight incandescent lamps which they serve, as satisfactorily

may be one-half the size of those in Fig. 5 for the same percentage voltage drop. Therefore since three-fourths the number of wires is required for Fig. 3 as for Fig. 5, and since each of these wires may be one-half the size of that necessary in Fig. 5, the amount of copper in Fig. 3 is three-eighths that necessary in Fig. 5 for the same percentage drop—it being assumed that the neutral is made the same size as the outer wires. The neutral may frequently be made smaller than the outer wires, as outlined later.

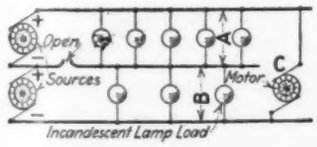


Fig. 12.—Open Neutral in a Three-Wire Circuit.

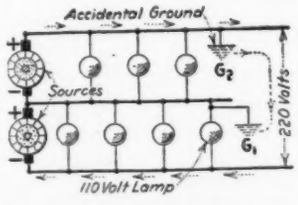


Fig. 13.—Ground on Three-Wire System Outer Wire.

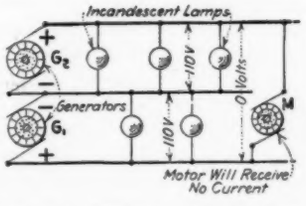


Fig. 14.—Reversal of Generators.

as does the equivalent three-wire circuit of Fig. 3. However, the Fig. 3 arrangement would, as will be shown, require much less copper in the line conductors for a given power loss, and a given percentage voltage drop, than would that of Fig. 5. The small numerals indicate the current intensities, in amperes, in the different parts of the circuits in the two illustrations.

A three-wire circuit with the neutral the same size as the outer wires requires only three-eighths the copper required for an equivalent two-wire circuit, providing the same per-

Example.

Consider the 110-volt two-wire circuit of Fig. 16, *I*, and the equivalent three-wire circuit of *II*. The transmission distance is the same for each of the two circuits. The load—eight incandescent lamps each taking 110 watts—is the same on *I* as on *II*. Referring to the two-wire circuit of *I*, each of the line wires is assumed to have a resistance of one ohm. Since each lamp takes a current of one ampere, the line current is eight amperes. Hence, as indicated, the line drop is 16 volts, the percentage line drop is 12.7 per cent and the line

power loss is 128 watts. If it be assumed that each line wire weighs 50 pounds, the weight of both line wires will be 100.

If a 110-220-volt three-wire circuit is arranged to transmit the same power with the same loss, it will have the characteristics diagrammed in *II*. Since it is in effect a 220-volt circuit, the current will be half of that of the circuit of *I*. Since power loss in a conductor$=I^2R$, if the current is halved a conductor of four times the resistance will carry it (the current) with the same power loss and with the same percentage voltage loss. Thus, for the same line power loss and the same percentage voltage drop as in *I*, the outer wires of *II* will each have a resistance of four ohms.

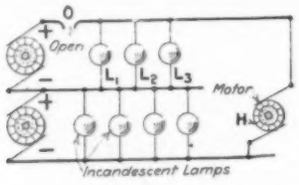


Fig. 15.—Open in the Outer of a Three-Wire System.

There is no drop or loss in the neutral wire since, the load being balanced, it carries no current. Then, as indicated, the line drop is 32 volts, but the percentage volts drop is 12.7 per cent—the same as in *I*. The power loss is 128 watts, the same as in *I*. Each outer wire of *II*, since it has four times the resistance of an outer of *I*, will have a weight of $50\times\frac{1}{4}=12.5$ pounds. If the neutral is made the same size as the outers, the total weight will be $3\times12.5=37.5$ pounds. Now 37.5 pounds is three-eighths of 100 pounds, hence the three-wire circuit of *II* transmits the same power, the same distance with the same power loss and same percentage voltage drop as does the two-wire circuit of *II*, but with three-eighths the weight of conductor.

If the neutral wire is made half the size of the outers, only 31.3 per cent of the copper is required that would be necessary for a two-wire system transmitting the same power the same distance with the same line power loss and percentage voltage drop. If the neutral is made one-third the size of the outers, the relative weight of copper is 29.2 per cent.

A hydraulic analogy of a three-wire circuit is shown in Fig. 6. The two rotary pumps, connected in series, are analogous to two direct-current generators connected in series for three-wire service. The pipe lines L_{13}—L_{14} and L_{15}—L_{16} correspond to the outer wires of a three-wire circuit. The pipe line N_3—N_5 corresponds to the neutral wire in a three-wire circuit. The current of weightless incompressible fluid in the pipe circuit—analogous to a current of electricity—will be impelled as shown by the arrows. The circulation is due to the hydraulic pressure (voltage) developed by the pumps. No fluid flows in the neutral between N_4 and N_6 because, with the circuit balanced as shown, there is no difference in hydraulic pressure between these two points. The small numerals with the letter *G* following them, indicate the gallons per minute—analogous to amperes—flowing in the different parts of the circuit.

Where the balance is and always will be perfect, no neutral wire is necessary. In out-of-door distribution systems the neutral is often made one-half the size of the outer wires. For interior wiring, the neutral is usually made the same size as the outers, where the outers are of No. 6 or smaller wire. Where the outers are larger than No. 6, the neutral is usually chosen so as to have about two-thirds the area of each outer.

The amount of unbalance that may come on a three-wire circuit depends on local conditions. In ordinary three-wire lighting systems the unbalanced load seldom exceeds 10 per cent of the total load. Probably 5 per cent is a fair average for a well laid-out system. Balancer sets for interior three-wire systems are frequently specified of sufficient capacity to take care of a 10-per-cent unbalance. Sometimes the unbalance on a poorly laid-out system may be over 30 per cent.

The methods of obtaining three-wire voltages will now be discussed. That suggested in Fig. 3, while excellent for certain conditions, is not economical for small installations because the operation of two generators is necessary. Its first cost is more and its efficiency is less than with an arrangement requiring the use of but one generator. The advantage of a two-generator installation (Fig. 3) is that any percentage of unbalance up to the capacity of one generator can be handled by it. The important methods of obtaining three-wire voltages are listed in Table I.

TABLE I.—ARRANGEMENTS FOR DERIVING THREE-WIRE VOLTAGES.

Direct Current.	1. A 220-volt generator in combination with a motor-generator balancer set, Fig. 7. 2. A three-wire or Dobrowolsky generator, Fig. 8. 3. A 220-volt generator in combination with a small rotary converter. Fig. 9. 4. A 220-volt generator in combination with storage-battery balancers. Fig. 10.
Alternating Current.	1. With a transformer, Fig. 11, *I*. 2. With an autotransformer or balance coil, Fig. 11, *II*.

If the neutral wire opens in a three-wire circuit, the lamps (Fig. 12) on the side, *A*, having the most lamps connected to it, will burn dimly or at under voltage, while the lamps connected to the side having the least number of lamps, *B*, will burn more brightly than normal or at over voltage. Any device *C* connected to the two outers will operate normally.

If one side of a lamp on a three-wire system becomes grounded, G_1, and there is another ground, G_2, on the opposite side of the system (Fig. 13), 220 volts will be impressed across the lamp and it will be burned out.

If one of the generators of a three-wire system becomes reversed, as at G_1 (Fig. 14), the lamps connected between both of the outside wires and the neutral will receive normal voltage, but the polarity will be reversed. Any receiver connected across the outside wires, *M* for example, will have no difference of potential across it and hence it will not operate.

If one of the outside wires of a three-wire system opens, O_* (Fig. 15), a device, *H*, connected across the two outside wires on the distant side of the break, will receive some current at 110 volts through the lamps, L_1, L_2 and L_3, connected to the broken side between the device and the break. These lamps will burn dimly when the device is connected, but the device will not receive enough current to operate it properly.

The general arrangement of three-wire feeders and mains may be substantially the same as that for two-wire systems. The important thing is to so balance the circuits as to maintain the currents in the two outside wires approximately equal. The lamps and other devices should be divided between the two side circuits of the system so that the loads will be, as nearly as possible, balanced when the circuit is loaded to its full capacity or when loaded to any fraction of it. All three wires—two outers and the neutral—should be routed to every location where any considerable amount of power is required; to every building in an outdoor distribution and to every distribution center in distributions within buildings. Where many lamps are to be lighted simultaneously the group should be controlled by three-pole switches to prevent unbalancing. Not only must loads on three-wire systems be balanced on the two side circuits, but the loads on the side circuits must also be distributed along both the circuits in approximately the same manner. If they are not, there may be considerable extra drop. This is one of the principal causes of excessive voltage variation that sometimes occurs on three-wire systems.

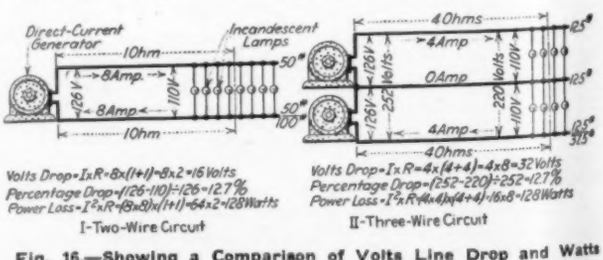

Direct-Current Generator
Incandescent Lamps
1 Ohm
8 Amp.
8 Amp.
126 Volts
110 Volts
50'
50'
100'
1 Ohm
4 Ohms
4 Amp.
0 Amp.
4 Amp.
126 Volts
252 Volts
220 Volts
110 Volts
125'
125'
125'
315'
4 Ohms
Volts Drop = I x R = 8 x (1+1) = 8 x 2 = 16 Volts
Percentage Drop = (126-110) ÷ 126 = 12.7%
Power Loss = I² x R = (8x8) x (1+1) = 64 x 2 = 128 Watts
I-Two-Wire Circuit
Volts Drop = I x R = 4 x (4+4) = 4 x 8 = 32 Volts
Percentage Drop = (252-220) ÷ 252 = 12.7%
Power Loss = I² x R = 4 x 4 x (4+4) = 16 x 8 = 128 Watts
II-Three-Wire Circuit

Fig. 16.—Showing a Comparison of Volts Line Drop and Watts Power Loss in Equivalent Two-Wire and Three-Wire Circuits.

POLES AND POLE-LINE CONSTRUCTION.—II.

Valuable Suggestions from a Paper Presented Before the Indiana Electric Light Association.

By G. L. Lindsley.

Preservative Treatment of Poles.

To treat or not to treat is a subject that operating managers and engineers have been giving each year an increasing amount of thought.

In its report of 1911, the Committee on Overhead Line Construction of the National Electric Light Association says: "The use of treated wooden poles and crossarms is recommended. The treatment . . . . should be by thorough impregnation with preservative by either closed or open-tank process."

The Forest Service for years has been talking open-tank treatment with creosote by the "hot and cold" process. While several of the pole companies have installed plants for the short-time open-tank treatments, it is only recently that any attempt has been made by them to give this "hot and cold" or long-time treatment. Their contention has been that the investment required for a plant of sufficient capacity was too great to warrant its installation. Recently, however, the interest taken in this method of treatment by operating companies has become so great that several plants have been installed and others are being erected. The company with which I am associated has three plants working and is interested in another under construction, while several others have one or two plants in active operation.

The Western Red Cedar Association, which seems to have taken the greatest interest in commercial preservative treatment, has recently adopted specifications for three different methods of treatment by the open-tank process. Treatment "A" provides for a 15-minute immersion in hot carbolineum: treatment "AA" for a 15-minute immersion in hot creosote; and treatment "B" for a four-hour immersion in hot creosote and two hours in cold. In all cases, the preservative, during the hot bath, must be kept between 180 and 215 degrees Fahrenheit, and in the "B" treatment, the temperature of the cold bath must not exceed 112 degrees Fahrenheit at the conclusion of the treatment.

The "A" and "AA" methods are undoubtedly sufficient under certain conditions, especially the "A" process, provided a good "carbolineum" is used. The specifications of the Association covering the analysis of that article provide for one that should prove efficient, provided the climatic and soil conditions are not too severe.

The "AA" method is, in my opinion, not sufficient and is not to be recommended where a desire is felt for a real added life. The toxic qualities are present in greater quantities in creosote than in carbolineum, but as these are also the most volatile of the constituents of creosote oil, unless a deep penetration is secured, they will evaporate shortly, leaving the pole unprotected and in some cases even more exposed and liable to decay than before.

For that reason, I recommend either the "A" or short-time carbolineum treatment, or the "B" or hot-and-cold creosote methods.

This "B" treatment is, briefly, the immersion of the butts of the poles to a point about 18 inches above the ground line in creosote at a temperature of approximately 200 degrees Fahrenheit for a period of four hours. The hot oil is then drawn off and oil at an atmospheric temperature is pumped into the tanks, in which the poles remain for two hours longer.

The theory of this method is that the immersion in the hot oil expels the moisture, and at the same time expands the air in the cells of the sapwood, while the cold bath following contracts the air, thereby forming a partial vacuum which draws the preservative into the wood. From our own experience, we find that this theory works out in most cases, but occasionally we run across a pole—sometimes a number of them—which resists penetration, even when the treatment is prolonged for several hours more than required.

In cedar, we find it is practically impossible to secure a penetration extending beyond the sapwood. We have made experiments in a pressure plant in the West that have convinced us there is a film of some kind between the sapwood and the heartwood of cedar that effectually prevents the oil penetrating beyond that point.

However, it is not necessary to secure a penetration deeper than the sapwood. Decay at the ground line always starts from the outside and works in. As long as the sapwood is sound, the pole is sound, so a penetration of that part of the pole sufficiently deep to overcome the volatilization of the preservative is all that is necessary. It is for that reason that the short-time treatment with carbolineum or creosote is recommended in certain cases.

The principal advantage of a thorough treatment of pole butts is, of course, the added life that is secured, and the consequent decrease in the annual charges. It should be considered as an investment, and not as an added expense. The superintendent of overhead construction of one of the largest power companies in the West puts it this way: "I will gladly conform to any standard method and specifications which in my opinion will secure for this company the results desired, that is, good return for the money invested. The average pole user has been, is now, and undoubtedly will be content with cheaper installations having shorter duration of life. We prefer to put in a little better value at first at higher fixed charges, knowing full well that high maintenance and rapid depreciation and consequent expensive replacement will be avoided. On this account we are willing to pay more than customary in order to secure a higher rate of return and greater saving." This company, I may add, is treating every pole that goes into its lines according to specifications "B."

The Forest Service in Bulletin 84, "Preservative Treatment of Poles," mentions another saving that may be effected by the use of properly treated poles. On page 38 we find the following: "It is the practice in pole specifications to require poles of larger diameter than the actual service requires, in order that a certain amount of deterioration by decay shall be allowable before replacement is needed. For example, if it is computed that a circumference of not less than 28 inches of sound wood in the pole at the ground line is required to support the strain to which the line is liable to be subjected, and the poles used have a circumference of 36 inches at the ground line, then eight inches of deterioration, or the equivalent of depth of decay of approximately 1¼ inches, is allowable before replacement is required.

"In some species otherwise durable the sapwood decays very quickly. Untreated white cedar poles in Georgia, inspected after being set in line four years, showed from 45 to 50 per cent of the number with sapwood completely decayed at the ground line. . . . . The heartwood of these poles is sound, and in nearly all cases is of sufficient dimension to meet the requirements of the line in which they are used, although, graded by the butt circumference, they fall decidedly lower than their original class. If there had been used originally poles of the grade represented by these after the sapwood has decayed, and if the butts had been well treated with creosote, so that their full size and strength would be maintained, not only would the poles be equally strong with those now in use, but their ultimate length of life would be greater, and the

difference in cost between the two grades of poles would in some cases offset the cost of the treatment. Pole users are, therefore, paying money for poles of larger diameter in order to secure longer life in that way that might more profitably be spent for preservative treatment. In short, the possibility of using lighter poles and giving them preservative treatment, so as to maintain their full size and strength, merits the attention of all pole users."

In this connection it may interest you to know that four of the biggest companies using poles in this country, and these four use more than all others put together annually, recently decided upon a policy of economic efficiency in pole-line construction, which I am reliably informed includes the preservative treatment of the butts of all poles hereafter used in their lines. They will use the hot-and-cold method or "B" treatment. I cite this to show you that my contentions regarding pole treatment are not without support.

Preventable waste, gentlemen, is a business crime. If a proper preservative treatment of pole butts enables you to use a smaller-butted pole, thereby effecting a saving in the first cost of your line; if it means added life and a consequent reduction in your annual charges and final cost, it seems to me that neglect to take advantage of this saving should properly be classed as a business crime.

Crossarms.

Crossarms are also an important part of pole-line construction. They should, therefore, like the pole, be selected with a view, first, to lasting qualities and, second, to strength. I have put lasting qualities first, because either of the woods used almost everywhere are much stronger than there is any need for. Fir has a breaking strength or modulus of rupture of about 10,170 pounds per square inch and southern pine slightly in excess of that figure. Either of these, however, will carry much more load than is required of them in any line construction.

The lasting quality in the arms is important. I am first, last and all the time a believer in the Douglas fir arm. When you order a Douglas fir arm you cannot get anything else, for you are not required to specify the amount of heartwood necessary. In the southern pine a certain percentage or relation of heart to sapwood is necessary to get the best strength. In Douglas fir there is no dry-rot, very small seams, and therefore it is particularly adapted for crossarm use. It needs no preservative treatment, because time seems to have no effect on it. It will outlast several untreated poles and all of those who have used it recommend it. Southern pine makes a good arm and is still used in the East and South. Fir, however, is rapidly increasing in favor and will ultimately be the wood universal for arms. Most of the members of this Association are using the fir arm and will support my statement.

I have noticed that many lines are built with the gain for the arm cut deep into the pole. If any of you have ever examined this gain after the pole is taken down, you have found that the gain was sound and that it showed that it was cut too deep, and further that all that was necessary to fasten the arm to the pole was to flatten the face of the pole just enough to give a purchase to the arm and to allow space for the bolts. The wires will do the rest. Don't weaken your pole by cutting a deep gain, as there is no necessity for it. You require the full strength of the pole at that point.

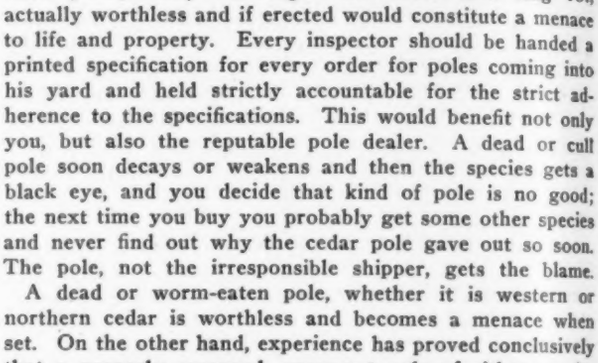
I would like to call your attention to another instance where you sometimes pay an unnecessary premium in the purchase of crossarms. You should try to make your specifications for arms so that you will not have to pay the manufacturer for waste ends that he is obliged to cut to make your arm. All logs are cut in multiples of two feet: 10, 12, 14, 16 and 18 feet long. When you order an arm five feet seven inches long the mill man charges you for a six-foot piece, for he must cut the arm from a 12-foot log. This will also apply to other odd lengths. For a nine-foot two-inch arm you are charged for a 10-foot piece of lumber, because nine feet and two inches cannot be cut from any stock length without loss, and you pay for the waste. Why not make your specification nine feet, thus making an even cut of an 18-foot stick with no waste?

You may deny the charge, but I want to say to you that many of you are making a big mistake in the inspection of your poles when received into your yards. I have visited a number of yards where the inspection is left to a man ignorant of the kind of pole he is supposed to inspect. Many times your yard man cannot tell a dead pole from a good live, green-cut pole and vice versa. I have been in yards where the inspector had just passed several hundred poles as good poles because they were straight and sound and looked nice, when in fact one-third were dead poles, many showing worm holes and ring rot, actually worthless and if erected would constitute a menace to life and property. Every inspector should be handed a printed specification for every order for poles coming into his yard and held strictly accountable for the strict adherence to the specifications. This would benefit not only you, but also the reputable pole dealer. A dead or cull pole soon decays or weakens and then the species gets a black eye, and you decide that kind of pole is no good; the next time you buy you probably get some other species and never find out why the cedar pole gave out so soon. The pole, not the irresponsible shipper, gets the blame.

A dead or worm-eaten pole, whether it is western or northern cedar is worthless and becomes a menace when set. On the other hand, experience has proved conclusively that a properly seasoned, green-cut pole of either species will last from 15 to 18 years under average conditions.

Easy Method of Locating Grounds or Short-Circuits on Lighting Circuits.

A ground or short-circuit on an electric lighting circuit can be easily located in the following simple manner which I find is not generally known. Place an ordinary lamp in one of



Simple Method of Locating Trouble on Lighting Circuit.

the fuse receptacles of the fuse block or entrance switch protecting the circuit in trouble, putting this on the ungrounded side. The lamp will then burn in series with the ground or short-circuit. If there are other lamps connected across the lines being tested, they must be turned out, otherwise the test lamp will burn in series with them. The circuit can then be sectionalized to locate the trouble. When it is found and cleared, the test lamp will go out.

Most commonly the trouble will be found in a drop cord or fixture, particularly in the sockets. It is an easy matter to disconnect these from the line, one at a time, until the lamp goes out. If this does not clear the line, it may be necessary to cut, starting at the middle of the circuit and working either way toward the fault, halving the part left each time, until the lamp goes out. The diagram illustrates the method.

F. E. Andrews.

THE DEALER AND STOREKEEPER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Store-Keeping for the Dealer in Electrical Goods

EXTENSIVE ADVERTISING DURING THE HOLIDAY SHOPPING SEASON.

By J. S. Vogel.

Electrical specialties, from a toaster or table lamp to a washer, make very desirable Christmas gifts. Many users of electricity are in the habit of buying their gifts at the department, jewelry or drug store. It is a habit that was formed years ago.

However, the average person is interested in anything that concerns the welfare of his family. If the electrical dealer can convince the public that his store offers many desirable, useful, practical and inexpensive articles for gift purposes he will reap the reward in the way of extra holiday profits.

An electrical service corporation in Southern Illinois last year doubled its holiday business by a systematic list of suggestions to the householder. During the months of October, November and December this concern inclosed a small pamphlet with every bill for service. The pamphlets were entirely devoted to suggestions for Christmas presents, telling of the various things that could be bought on desirable terms. For instance, electric toasters and flatirons were offered at regular prices, to be paid for at the rate of 50 cents per month, to be added to the regular bills for electricity. Table lamps and similar items were offered on the same plan, but at the rate of $2 to $5 per month. In addition to this, the company agreed to deliver all Christmas goods on December 24.

The smaller items sold were usually paid for in cash, even when offered on these desirable terms. This was for the reason that most of the buyers were men, making presents to their wives, mothers or sisters. But many women acted on the suggestion: "Make yourself a present and pay for it in small monthly installments."

When suggesting the more expensive goods, such as electric washers, large hall lamps, etc., the company explained that if a man made the purchase on the installment plan and did not want the monthly bill mailed to the house with the bill for electricity, the bill would be mailed to the office. This suggestion made several sales that otherwise would not have been made, as the purchasers explained that they did not want a bill for a Christmas present go to the house, to be paid from the household allowance.

These plans can be used anywhere and by almost any dealer in electrical goods. Instead of mailing out a pamphlet with the bill for electricity, newspaper advertising space can be used. The public must be told what the electric shop offers in the way of practical Christmas gifts. Special store window displays, newspaper advertising or circulars will all accomplish a certain amount of results.

Good window displays are always profitable, especially if they contain a liberal amount of price cards. The latter give definite messages to the people passing the window, and the more liberally and carefully they are used the busier will the salespeople be.

One of the essential features in the campaign of selling electrical goods for holiday gifts is an early start. The early shopper, the man who can afford to buy gifts a month or two before Christmas is usually the one who can afford to pay liberal prices for them. Another advantage of an early start is that buyers begin to think of electrical specialties at an early date—and early impressions count big.

A Wisconsin electrical service corporation last year did considerable business in electrical goods by offering an extra five per cent discount on all articles purchased during October and November for gift purposes. The purchases were, of course, delivered on December 24, according to directions of and with the card of the buyer.

A Chicago dealer sold a great number of tree-lighting outfits by placing an electrical Christmas tree in his window, with cards describing the different outfits and giving the prices. This tree was a good drawing card and attracted the attention of the public to the many other electrical appliances shown in the display.

The average dealer can double his Christmas sales if he goes about it in the right manner and with the right spirit. The average person does not fully realize the great extent to which electricity can be used for saving labor, affording conveniences, etc. It requires hard work to make the maximum success in the selling of electrical goods, but prospective customers are everywhere, and it remains for the dealers to tell the public of the services that can be performed by electricity.

Prize Winning Fan Display.

One of the annual events looked forward to each year with a great deal of interest is the fan window-display contest conducted by the Western Electric Company. All dealers who handle Western Electric fans are eligible, the idea of the company being to encourage its customers to devote more attention to dressing show windows and also, of course, to increase the sale of fans.

Because of the exceptional fan season of 1916 the contest this year has been of unusual interest and there were more participants than ever before, many original displays being entered.

The board of judges, composed of well known experts outside the Western Electric organization, has just announced the winners, there being a total of 10 prizes aggregating $250.

Herewith is shown the winner of the first prize of $100, the Wheeler Company, of Kansas City, Mo. The window depicted an Alaskan scene, with the customary icebergs, snow drifts, etc. To the left of the window was a miniature house with a placard bearing the inscription "Kansas City, 100 Degrees in the Shade." Several fans were shown in operation and in the background was a card reading, "A Cool Wave Is Here." A miniature electric train was run through a tunnel of snow.

Other prize-winning displays will be shown in a later issue.

Securing Holiday Business by Co-operation

Why the Combined Efforts of Manufacturers, Jobbers and Dealers Are Necessary for the Successful and Satisfactory Retailing of Electrical Appliances During the Pre-Holiday Season

By M. V. RUTHERFORD
Sales Manager, Sterling Electric Company, Minneapolis, Minn.

MANUFACTURERS of electrical holiday merchandise have a wider field in which to dispose of their wares than they realize. Manufacturers of an article that has been on the market for years find it necessary to make numerous changes in order to properly market it. It sometimes becomes necessary to change the whole design as well as add new features, but in some way it is disguised or the style changed. By so doing the demand is enlivened, for the public is continually in search of novelties of different kinds.

This is not the case with electrical goods because the average woman is becoming educated to the fact that electrical appliances do best the one thing that she desires most, and that is to take the drudgery out of housework. Under these conditions these devices are daily becoming more of a necessity, which creates the demand and to a great extent eliminates the changes in design necessary in other goods, thereby eliminating the additional expense that would be occasioned. When an electrical manufacturer has adopted some artistic design or style, the same dies and molds may be used from year to year, providing that the designs do their share in creating the demand. Did you ever hear of a woman buying a new cook stove just because the style of the oven door changed or the legs on the more up-to-date stoves were nickel instead of iron?

Stop for a moment and consider what part electricity plays in the modern home. It cooks, cleans, washes, illuminates, heats or cools just as desired, and the use of high-tension violet-ray and vibrator massage instrument builds up and maintains good health. These are the wonderful duties electricity performs in the home. Thus, considering the magic this modern Aladdin performs, it is not making too broad a statement to proclaim that the field of the electrical appliance manufacturers is unlimited.

Considerations for the Electrical Manufacturer.

The first consideration to enter the manufacturer's mind when making electrical household appliances should be their quality, and this is best left to the manufacturer himself. His own experience will tell him the exact thickness of copper plate to put in an electric percolator or chafing dish to make it strong and durable. The same applies to all material used by the manufacturer.

The manufacturer must remember when designing his appliances that he is catering to fastidious women, and, therefore, make his products attractive and appealing to the eye. This applies to a washing machine or a large electric kitchen-range as well as to the smaller appliances. Take, for instance, a very plain, unattractive looking washing machine (even if it may be of the highest quality), place it beside a more attractive machine that may not be of the best quality. Then watch your lady customer, and you will note if you have had experience along this line that it takes more time and pains to sell her the unattractive machine than the attractive appearing one. The same applies to a range. Let one be trimmed in white enamel and nickel. Place it alongside of one minus these attractions. See which will catch her eye. The manufacturer may say this is very true, but that the consumer will have to pay more for the range with the better finish. This may be the case, but a woman would rather pay more for something that pleases her than save a little and buy something against her judgment. Therefore, the article must be attractive.

In the opinion of those who know, the next consideration is the safety features of the appliance. Elimination of belts, pulleys, revolving shafts, etc., as much as possible on electrical washing machines is advisable. If they must be used they should be well guarded. Heating or cooking appliances and vacuum cleaners must have the terminals so constructed that they will eliminate the possibility of the operator receiving a shock.

When the manufacturer has put quality in his wares, made them attractive, and remembered the "safety first" slogan, the salesman selling them to the customer can conscientiously represent the goods to be all that he claims. In this way the manufacturer has made the first and greatest steps toward assisting the jobber and dealer in disposing of his products. But he must not stop here. Now comes the task of creating a greater demand for his individual line than that for his competitor's.

Different manufacturers view the advertising game from various angles. Some believe in national magazine advertising, others in local newspaper advertising or campaigns, the expenses of which possibly might be carried by the manufacturer alone or divided with the jobber or dealer. All these different modes of advertising have their good points. It is advisable to obtain a catch trade-name or slogan that applies to a particular line of goods. Through constant advertising this trade-name can be burned into the minds of the public to such an extent that when a prospective purchaser goes into an electrical store he will unconsciously mention it. Right here is where the manufacturer creates demand. A progressive dealer will sell what the public calls for. Let a few people come in search of a certain line of goods and see how quickly the up-to-date merchant orders them. When the manufacturer has done his duty by producing goods of quality and creating the demand, it is then up to the jobber.

Co-operation by the Electrical Jobber.

The jobber will purchase from the manufacturer the lines that the dealer demands. The jobber should lay in complete lines of various goods that are sold during the holidays. The dealer depends on the jobber's stock. Nothing is more disappointing and causes greater loss to all concerned than to have the jobber run short of holiday merchandise during the busy season. It must be remembered the largest percentage of Christmas goods are purchased for gifts, and the consumer wants them for Christmas day, not the day after. The heaviest purchasing is done a very few days before Christmas and if the jobber has not the stock on hand he compels the dealer to sell something else or possibly lose sales altogether. So the jobber should stock up heavily for the occasion. Even if he does have a few articles left over, it is not dead stock. Electrical appliances sell all the year around. When ordering from the manufacturer he cannot go far wrong if he checks up the stock he sold the previous year and adds a certain percentage for increased business. The jobber should bear in mind to put in a varied stock. If a certain manufacturer makes a complete line of appliances, including articles not regularly sold, the jobber should remember that if there is

ever a demand for these goods it will be during the holiday season, so, therefore, he should be a jobber in every sense of the word and carry the complete line, not forgetting that the dealer is depending on him. If he would give him service and hold his business he must be able to fill the orders without delay, for the dealer's golden harvest in the electrical appliance sales is during the Christmas season.

Problems for the Electrical Dealer.

Now when it comes to the dealer we have an entirely different version of the story. We are, so to speak, "up against the real thing." All that the manufacturer and jobber have done to this point is preparatory to the climax, and that is disposing of it to the actual consumer, the one party in the transaction who has the power to knock the underpinning from under all and let their efforts be as naught. Let us see the best way to meet His Majesty, Mr. Customer—our real boss.

Let us begin at the beginning. You may have gold dollars and be offering them for sale at 50 cents. But suppose the public is not aware of the fact. You will evidently keep them. Therefore, the dealer must find ways and means of attracting customers. In the time of our fathers there was a saying that "the pen was mightier than the sword." In this age of hustle let us substitute another word in place of the word "pen," and make it: "The press is mightier than the sword." Therefore, we will call into the play this wonderful power of the hour by advertising in its columns. In writing advertisements it is necessary to use something to attract, some suggestive cut, say a picture of Santa Claus placing electrical appliances on a Christmas tree or some other similar cut. If the dealer does not possess such cuts they can be obtained from local concerns who make a business of furnishing them. When the advertisement has been planned well enough to attract the eye of the reader, then with as few words as possible the wares to be sold should be presented. Cuts to illustrate them are necessary. If a percolator is being advertised, a cut of it and the price will sell percolators faster than a long statement about its quality and usefulness. The public likes to look at pictures. It is failure to cram too much into an advertisement. Some advertisers labor under impression that because they are buying space that it is necessary to fill every available inch with reading matter. One cut of a flat-iron or a percolator properly placed, with a few simple words of description and some white space, will be noticed, while a congested ad will go unnoticed.

Dealer Show Windows and Interiors.

The next and almost as great a drawing power is the dealer's show windows. If he would make a success he must put up a good front. There is no exception to the rule. An unattractive electrical show window makes about as much of a hit as a man at a ball in a full dress suit minus his collar and tie. The newspaper advertisement may have had drawing power and the interior of the store may be attractively trimmed, but the chain is broken without the attractive window. An attractive window does not mean an elaborate affair costing a great deal of money, but one neatly trimmed with here and there a suggestion of the holiday season. Have articles in the window attractively arranged with a small card placed before each article bearing its price. Colors that are seasonable for Christmas window trimming are red, white and green. By using this combination a warm, attractive effect can be obtained. Articles on pedestals or steps are shown to the best advantage. If there is nothing else small boxes daintily covered will serve. Salesmen should not be allowed to disarrange a window display, because up to the last minute before closing time Christmas eve it will be a great silent salesman inviting the customer in to inspect and buy wares.

The interior of store should be decorated so as to give the customer the Christmas spirit, make him feel in the mood of purchasing. Proper environments play a greater part in the sale of holiday merchandising than at any other time of the year. Suitable decorations can be purchased from different local stores at very small expense, and with a little extra effort and time the store can be transformed into a mecca like Christmas fairyland. Show-cases, counters, and other display places trimmed with Christmas decorations add to the effect produced on the customer when entering a store.

Every article in stock should bear a small tag giving the price. If this is done anyone from the office or other part of the establishment can readily step into the store and assist with the sales. By receiving this outside assistance when the store is filled with customers the dealer will be able to give them better service. Christmas stock should not be placed high up on the shelves where it is necessary to climb or reach for it. It is better to have articles where they can be quickly obtained.

Suggestions for Merchandising.

A small card bearing the season's greetings and the company's name if placed in each bundle is clever advertising.

If at any time a salesman should use the power of suggestion it should be at Christmas time, for customers are in the mood to receive suggestions as to proper gifts to be given to their friends. It happens very often that after a customer makes a purchase, he will ask if it can be returned and exchanged for something else after the holidays, providing the person receiving the remembrance is not pleased with it. Here is where a little free advertising can be obtained. By all means give the customer this permission. Who knows, but what the person exchanging the article may purchase something else.

Thus, if the manufacturers, jobbers, and dealers, each in their respective turn, utilize their good judgment in producing, handling and selling electrical appliances they will receive their just share of the business. Besides, it will be a source of satisfaction to know that customers have received full value for their good money and that every possible effort has been made to please them.

Getting Ready for the Business Rush During the Holiday Shopping Season.

The Christmas season is a greater event in the business history of the electrical dealer than ever before, for during the past few years the public has realized that the electrical stores can supply very attractive gifts, not to mention such necessary accessories as electric lamps to take the place of candles on the Christmas tree.

One thing, by way of preparedness, which should commend itself to the dealer is the matter of keeping an eye open for extra help. Picking the right kind of salespeople to help out during the Christmas rush is not an easy matter, and should not be left to the last minute. It is most irritating, from the standpoint of customers, to find salesmen who know little or nothing about the stock and less about prices, and whose bungling and uncertain way of handling sales uses up time and patience.

Most electrical dealers use men exclusively for sales work, but it is not a bad plan to add a few bright girls for the holidays. They adapt themselves readily to meeting customers and finding out what they want, and intelligent girls may be employed for special occasions more readily than intelligent men, most of whom are already employed. Besides, more women will visit the store during the holidays, and girls can wait on them with facility.

Another point is to have as many items as possible wrapped and ready to deliver. Take the matter of the varicolored electric lamps for Christmas tree decorations. These can be fixed up in standard combinations, so that the customer's wishes can be taken care of without delay.

NEW APPLIANCES

A Weekly Review of the Latest Developments and Current Information Respecting Electrical and Kindred Mechanical Appliances

New Hubbell Angle Reflector.

Repeated tests have determined the fact that when parabolic angle reflectors are attached to sockets suspended in a vertical position the best concentration of light in the downward direction is obtained by placing the reflectors to make an angle of 30 degrees with the horizontal. To carry out this result a line of 6.5-inch parabolic reflectors has been placed on the market by the firm of Harvey Hubbell, Incorporated, Bridgeport, Conn. In these reflectors the holders are located so as to produce the relations referred to. These reflectors are made either of steel, aluminum or brass. The two former types are finished with a pleasing shade of green on the outside and have a matt aluminum finish of superior reflecting quality on the inside. The brass reflectors have brush brass as their standard outside finish and aluminum inside, but any special finish desired can be obtained. All of these reflectors are furnished with the standard Hubbell contractile collar which permits a rigid attachment of the reflector to the socket without the need of any additional shade-holder.

New Parabolic Angle Reflector.

A New Porcelain Cleat Base.

The Bryant Electric Company, Bridgeport, Conn., recently put on the market a new porcelain cleat base of the receptable character for knob-and-tube work and other wiring. This device is particularly valuable for use where the local rules require covered connections. As will be noted from the illustration, which has what is known as the BY. base, this base is made in two parts, one of which can be fastened directly to the ceiling beam overhead and permits of the wiring being fastened to the terminals before the other part of the device is attached. Furthermore, as will be noted, the device is so made that it is possible to use with it practically any one of the 27 "New Wrinkle" bodies (sockets, switches or receptacles).

A regular "New Wrinkle" ring or cap collar is permanently fastened in the opening of the base, which makes it possible to readily attach the "New Wrinkle" bodies by means of the novel spring-clip fastenings in the corrugated ends of the standard "New Wrinkle" shells. By means of this base it is possible to not only make a more convenient job, one more readily installed, but a neater and more finished job and one that complies with every requirement for this class of work. This device is also particularly desirable where exposed wiring is used for temporary or permanent decorative purposes.

Porcelain Cleat Base.

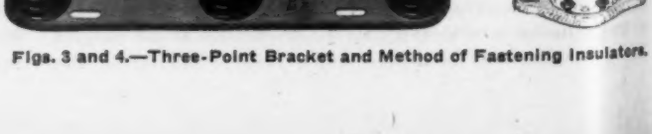
New Type of Steel Brackets for Lowering the Cost of Distribution.

The accompanying illustrations show a new line of wall brackets designed to reduce the cost of service connections without in the least impairing safety or service. They have been thoroughly tested in practice and are now in successful use on a large scale, giving perfect satisfaction and saving money. These brackets have some remarkably interesting features and are making a strong appeal to central-station managers and superintendents of distribution.

Figs. 1 and 2.—One and Two-Point Brackets.

Figs. 1, 2 and 3 show one, two and three-point brackets, respectively. Each bracket consists of a sherardized stamped-steel base plate on which are mounted high-grade porcelain insulators of unique design. The insulators are secured to the base plates by means of sherardized U-bolts and nuts, as shown in the phantom view of the one-point bracket, Fig. 4. The round transverse holes shown in the insulators are for the purpose of securing the wires; the U-bolts pass completely around these holes. In other words, the insulators are "iron bound," the construction being very similar to that of strain insulators. The peculiarity of this design results in a bracket having not only great tensile strength, but also a bracket which can be installed with great ease and rapidity. For example, the necessity of using tie wires has been entirely eliminated. On the other hand, the design of the insulators is such that the wires may be secured with tie wires in the regular way, if so desired.

Figs. 5 and 6 show two typical installations, the former being from a photograph of an actual installation on a frame dwelling. It will be noted that the service wires leading from pole are merely threaded through the holes in the upper bracket and dead-ended, by looping, at the



Figs. 3 and 4.—Three-Point Bracket and Method of Fastening Insulators.

lower bracket. The weight of the wires, between the pole and the building, always keeps the short vertical spans between the upper and lower brackets taut; this feature eliminates complaints on account of "noisy wires." It will further be noted, by reference to Fig. 6, that by removal of the center insulator, a three-point bracket may be used in making a right-angle turn with two wires and the wires kept parallel. Insulators on the two-point brackets are on 9-inch centers and on the three-point brackets on 6-inch centers.

The design of these brackets is such that their use is practically universal, as they may be installed in either a vertical or horizontal position, or at any angle. This is an especially important feature, as the necessity of carrying stocks of a large variety of brackets for different types of service connections is eliminated. With the one, two and three-point brackets and the corner chairs almost any type of connection may be made. As the brackets are shipped complete with insulators, it is not necessary to handle separate shipments of brackets and insulators; a considerable economy results from this fact. A very simple form of corner chair is used to secure the brackets at corners.

A comparison of Figs. 5 and 7, both from photographs of actual installations and in the same proportion, shows the improved appearance of service connections made with this new type of bracket over those made with wood brackets.

Fig. 5.—Typical Use of New Brackets.

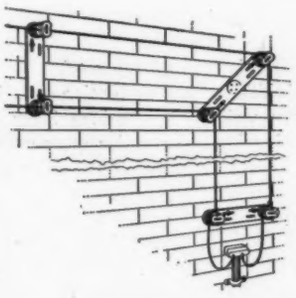


Fig. 6.—Using Three-Point Bracket for Right-Angle Turn.

The cost, installed, will compare most favorably with those where wood brackets are used. It will be noted further that the stress from the weight of the wires leading from the pole is almost directly from the point of support; practically no leverage obtains as is the case where either wood or steel "pin" type brackets are used.

These brackets will also be found to be admirably adapted for supporting open feeders in industrial plants, mills, warehouses, etc., and can readily be attached to steel girders. The line is being manufactured and marketed by the National Metal Molding Company, Fulton Building, Pittsburgh, Pa.

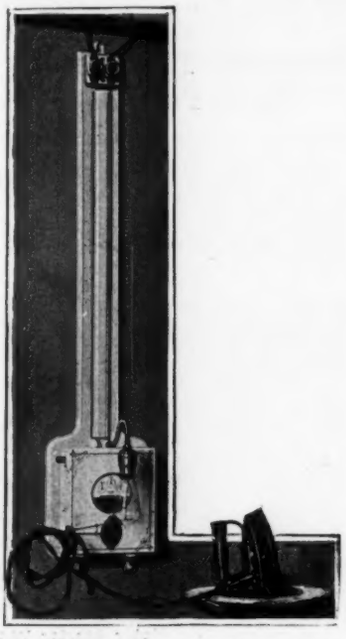
Low-Cost Combination Entrance Service Box.

In a large number of cities, particularly in the South, it is possible to secure new customers for central-station companies only by providing service at exceptionally low cost. This has required types of service boxes that can be installed for only a few dollars.

In the accompanying illustration is shown such a service box which is manufactured by the Electrical Development Company, 938 Lafayette Street, New Orleans, La. A very large number of these combination entrance service boxes have been used in New Orleans and other southern cities and these have proven to be exceedingly satisfactory in securing business that otherwise was not obtainable.

The wooden base on which the service box and entrance fuses are mounted is a self-contained fixture. It is hung on a nail at the top and fastened by means of a few screws at the bottom. After being thus mounted the only work necessary to connect it up is to bring the service wires into the building, connect them to the binding screws and the service fuse block. The entire installation can be completed in a few minutes and likewise as quickly removed without disfiguring the premises in any degree.

Fig. 7.—Old-Style Installation.

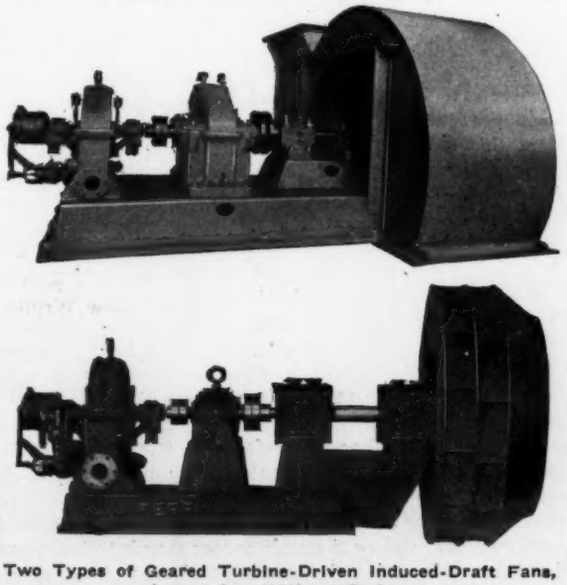


Combined Service and Meter Box With Lamp and Iron Outlet.

Geared Turbine-Driven Induced-Draft Fans.

The simplicity of operation and reliability of steam turbines make them specially suitable for boiler-room service, but their relatively high speed has until recently prevented their being extensively used for driving induced-draft fans, as such fans, on account of the large volumes handled, are usually of relatively slow speed.

With the perfection and general adoption of high-speed reduction gears, turbine drive for induced-draft fans is

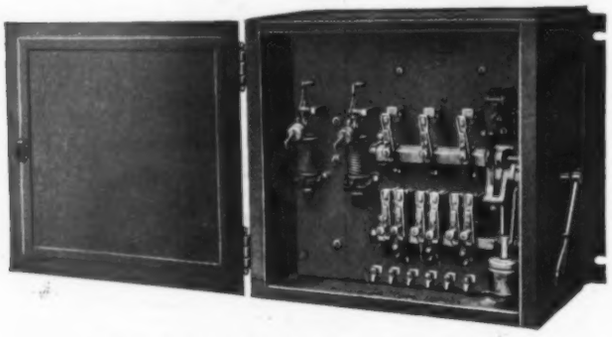


Two Types of Geared Turbine-Driven Induced-Draft Fans, Lower One Without Casing.

becoming more generally used, and a considerable number of geared turbine-driven induced-draft fans are now in operation. The illustrations show typical units. The turbines on these units were built by the Terry Steam Turbine Company, Hartford, Conn., and the fans were built by the Green Fuel Economizer Company.

Automatic Timing Device on New C-H Motor Starter Prevents Improper Starting and Line Surges.

The use of the usual types of hand-operated motor starter sometimes results in hasty and improper starting of alternating-current motors, because the speed of accelerating and cutting out the resistance from the motor circuit is left



New C-H Motor Starter With Timing Element.

entirely to the judgment of the operator. With the new starter shown in the illustration the operator merely closes the motor circuit by throwing the lever up and the subsequent acceleration is automatic and the time can be adjusted as desired.

This controller consists essentially of two square shafts, the upper one carrying the main contacts and provided with a handle for the operation, and the lower one carrying six fingers arranged in such a manner that they make contact with the stationary contacts in rotation; that is, one closes after the other, the time of closure being determined by a dashpot which prevents improper and hasty starting.

For the control of squirrel-cage motors, resistance is inserted in the primary circuit of the motor. After the closure of the main contacts on the upper shaft, the resistance which is in circuit and in series with these main contacts is gradually cut out by the drum fingers on the lower shaft, and when all the fingers are closed, the resistance is short-circuited and the motor is directly connected across the line. As soon as the main contacts are closed, the no-voltage release is energized, and it then holds the main shaft in the closed-circuit position. In case of failure of voltage, this no-voltage coil releases the upper shaft and this opens the motor circuit completely.

If desired, a push button may be installed in this no-voltage release circuit so that the motor may be stopped from any convenient point, or overloads may be connected in this circuit to open same and to automatically protect the motor against excessive load.

The motor may also be stopped by pushing the operating handle to the extreme lower position, in which it engages the upper shaft and pulls it away from the no-voltage release, thereby opening the main contacts.

It will be noted that in the "off" position the lower contacts are all closed and therefore the starting resistance is short-circuited, but these contacts are open before the upper contacts are closed so that the motor is always started with all the resistance in circuit. On the other hand, this arrangement allows the main motor circuit to be opened without first reinserting the starting resistance into this circuit, an arrangement which is common on other types of manual starters and which is to some extent objectionable, as it causes some sparking on the contacts while the resistance is inserted.

In case of slip-ring type motors, the lower contacts control resistance in the secondary circuit of the motor, while the upper contacts close the primary circuit. With such motors the fact that the resistance is not reinserted in the secondary circuit of the motor before opening the primary circuit is particularly valuable, as the sparking due to the opening of the primary circuit is greater the higher the resistance that is inserted in the secondary circuit.

The current-breaking capacity of the apparatus is large and the spacing of the primary contacts and their opening is such that no additional knife switch needs to be installed for the complete separation of the motor from the circuit. This controller, made by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., may be combined with such protecting devices as fuses or time-limit overloads, which can be mounted directly on the same panel with the operating mechanism, making a self-contained unit.

Rutenber Electric Ranges.

The growing popularity of electric ranges has induced the Rutenber Electric Company, Marion, Ind., to place on the market some simple types of these very useful appliances. Two of these are shown in accompanying illustrations. A similar model with three top burners is also made.

In the smaller range the oven has dimensions 18 by 12 by 14 inches and in the larger one, with the four-burner top, the oven is 16 inches deep instead of 12. The oven has walls made of metal that is formed by special tools, making a very tight fit at all joints so that the entire oven is practically air-tight. In the oven walls is a two-inch layer of rock wool which thoroughly insulates the entire compartment, thus carrying out the principle of the fireless cooker and resulting in very decided heat economy. It is said that these ovens will maintain a baking temperature for two or three hours after the current has been turned off. Each oven has two removable heating units, one at the top and the other at the bottom. Each of these units is arranged for three heats, the maximum consumption of the upper element being 1,500 watts and of the lower one 800 watts. The higher consumption of the upper element is for the purpose of making it effective for broiling. Each oven is equipped with a broiling pan and racks. These racks or supports are readily removable; they are made of cold-rolled steel with white nickel finish. The oven door has a thermometer to permit at-

Rutenber Electric Range With Two-Burner Top.

Larger Range With Four-Burner Top.

taining exactly the temperature desired. The arrangement and character of the oven elements is such that baking temperature can be reached within ten minutes after turning on the current, which it is claimed is more rapid than in any other type of electric range.

The top of the range is made of pressed steel and equipped with two, three or four radiant-type elements, each having a diameter of eight inches. Each of these elements is controlled by a three-heat switch and has a maximum consumption of 1,000 watts. The coils of these elements are spiral form and are laid in deep grooves in a compound made of a special clay product which is a good heat insulator and therefore reflects the heat back to the cooking utensils. The heat is evenly distributed over the entire element. These elements glow at a bright red almost instantly after turning on the switch. They are not injured by any liquids boiling over, as such are instantly burned off so as to leave the coils perfectly clean. The material on which the coils are mounted is impervious to water, acids and other fluids used in cooking. The elements are readily removable and are connected by means of substantial terminals, extra heavy pins and nuts being used to insure reliable and continued operation.

The body of the stove is made of blue polished steel, which is practically proof against rusting. The only cast iron used in these stoves is for the legs, door frames and catches. Each of the ranges is supplied either in plain black baked enamel or with nickel trimmings.

Martin Portable Vise Stand and Conduit Bender.

In all electrical construction work of the most modern type conduit is used very extensively. To facilitate the installation of conduit it is necessary to have good and convenient tools. Considerable bending, cutting and threading of conduit is necessary to fit local conditions and for this purpose it is customary for the wireman to rig up some kind of a vise stand or work bench, which consumes considerable time, however.

To avoid this lost time and in order to provide a vise stand which practically is a compact work bench of a portable character, the firm of H. P. Martin & Sons, Owensboro, Ky., has placed on the market the device illustrated. It consists of a stand made of No. 16 sheet iron thoroughly braced with angle irons and well riveted. The outfit rests upon four three-fourths-inch pipe legs which are removable. In setting up the outfit these pipe legs are slipped into sockets at the corners of the stand and the whole device is ready for use in a few moments. When these legs are removed they can be clamped to the outfit by means of the chain vise and readily taken from job to job, the weight of the complete outfit being only 45 pounds. At the front end of the stand is mounted either a Reed hinge vise or a Vulcan chain vise. The outfit can be obtained without vise, however, if desired. It can also be obtained without the pipe legs.

When conduit or pipe is to be cut or threaded it is fastened in the vise so that the bender device at the rear end of the stand acts as a guide and rest. This makes the pipe absolutely rigid and it can be threaded or cut with ease. The front legs of the stand project forward only a small amount, so that short nipples can be threaded or short pieces cut without danger that the handles of the die stock will strike the legs.

For bending conduit or pipe a rounded guide is mounted in the back upper part of the stand and alongside it is a hole to receive the pipe. The method of bending is clearly shown in one of the illustrations. It is possible to bend conduit or pipe from one-eighth to three-fourths-inch size without danger of kinking. The rear legs of the stand are attached at an obtuse angle so that strong pressure may be exerted downward on the conduit without liability of tilting or upsetting the stand. A large number of these stands are in use by progressive electrical contractors who have found them a means of materially saving time and labor costs in construction.

Martin Vise Stand and Conduit Bender.

View Showing Easy Conduit Bending.

View Showing Portability.

INDUSTRY ACTIVITIES

Railway & Industrial Engineering Company, Pittsburgh, Pa., is sending out a mailing folder on its outdoor substations and Burke horn-gap apparatus.

Dayton Engineering Laboratories Company, in the October issue of the *Delco Magazine,* gives considerable space to the cross-country run made from San Francisco to New York City by a seven-passenger automobile equipped with a Delco ignition system.

The Carbo Corporation, manufacturer of patented steel supporting systems, announces that it has moved its main offices to its factory at Chicago Heights, Ill., in order to be able to fill its numerous post and pole orders more promptly, and to keep in closer touch with factory operations.

National Metal Molding Company, Pittsburgh, Pa., has issued bulletin No. 600, illustrating and describing the new line of National wall brackets, which are of unique construction and designed to facilitate and reduce the cost of installation of distributing circuits, particularly service connections by central-station companies.

The Packard Electric Company, Warren, O., calls attention to the fact that Packard cable was used for the ignition system of an automobile in a 14-day non-stop test on the Sheepshead Bay speedway recently, the machine covering 10,848 miles without wire trouble. In spite of the varying weather conditions the cable delivered without failure an estimated 5,424 sparks each minute of the run.

Trumbull Electric Manufacturing Company, Plainville, Conn., has issued Catalog No. 11 on its lines of knife, push and snap switches, panelboards, cabinets, switchboards, cutouts, rosettes, receptacles, service boxes, insulating joints, armored cable and other electrical supplies. The company's many articles of manufacture are well illustrated and described, and list prices are quoted. The catalog is provided with a handy index system, and it will make a valuable adjunct to any dealer's desk.

Central Electric Company, Chicago, Ill., is distributing a novel booklet to central stations, dealers and dealer-contractors. There are 48 pages, well illustrated with cuts of electrical merchandise and devices especially suitable for the holiday trade. The unusual feature of the booklet lies in the fact that Central Electric Company's name does not appear on the cover or inside. The booklets are furnished with the dealer's name printed on the cover, thus constituting an individual electrical gift suggestion book for distribution among the customers of the central stations and dealers who take advantage of this very liberal offer.

Brooklyn Edison Company Establishes Investment Fund.—The Edison Electric Illuminating Company of Brooklyn has established an investment fund which is administered for the benefit of the employees without expense to them. It permits employees to invest their savings in small amounts, either in lump sums or on a percentage basis of their salaries. The money is invested in the securities of the Kings County Electric Light & Power Company and the Edison Electric Illuminating Company of Brooklyn, and employees receive dividends of 6 per cent per annum in quarterly payments. This fund is one of the means taken by the company to encourage thrift among its employees and to interest them in the company's affairs. The fund is administered by a board of seven trustees, consisting of the general manager, treasurer and auditor of the company, two directors designated by the president and two employees selected by the subscribers to the fund. There are at present about 1,415 employees who are subscribers.

The B. & K. Manufacturing Company, New Britain, Conn., has announced that its corporate name has been changed from the Barnes & Kobart Manufacturing Company to that given above. The executive and general offices of the company are now located at its New Britain factory.

Western Electric Company Secures New Buffalo Location.—The Western Electric Company has moved its offices and showrooms in Buffalo, N. Y., to 709-711 Main Street. The new location, with two large show windows fronting on as many streets, affords splendid display facilities. The full lines of Western Electric products will be carried and the high standard of service that marked the company's business at the old office will be strictly maintained. J. W. Tabb is manager of the Buffalo store.

The National Conduit & Cable Company, 41 Park Row, New York City, in its last issue of *Copper Gossip,* states that the volume of business in copper lately has been of record-breaking proportions, the buying being the heaviest in the history of the metal. Speculation is made as to whether the recent order of the Allies for 448,000,000 pounds for delivery during the first half of 1917 will represent the total exports for that period. Buying of copper for domestic consumption has developed on a large scale.

Municipalities May Sell Electric Appliances.—The Supreme Court of Michigan has recently handed down a decision in a case brought by an electrical dealer of South Haven to prohibit that city from selling electric appliances and fixtures, holding that such competition was proving injurious to his business. The dealer contended that while the city had a right to own and operate a lighting plant, under the state constitution it could not engage in any private business. In its decision for the city, the court holds that although the constitutional provision does not say exactly what the city can own and operate, common sense will permit the municipality to make proper sales of such things as will enable the consumer properly to use the electrical energy, and that the case of electricity differs from that of water in that the state in which it is delivered over the wires makes its use impossible directly.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a very elaborate and profusely illustrated circular, No. 1516-A, covering electric locomotives for freight haulage. This subject is discussed from all angles, including reasons for the adoption of electric locomotives and discussions of freight traffic by electric railways, a detailed description of the equipment used in such work, as well as the Interstate Commerce Commission requirements for the service. Leaflet 3764-A describes the Westinghouse No. 323-V railway motor having a rating of 30 kilowatts at 600 volts. This motor is said to represent the latest development in railway motors of the split-frame type. The No. 101-K railway motor, with the same rating, is described and illustrated in considerable detail in Leaflet 3510. This motor is especially adapted to operating conditions requiring the handling of heavy loads at slow speed without undue draft of current on the generating equipments. The question of standard railway equipments is treated in Circular 1577, just issued by the Westinghouse company. This question is becoming of more and more importance to the railway industry, and the information given in this circular is intended to aid in the adoption of certain standards. Drum-type controllers for railway service are described and illustrated in Circular 1571.

PERSONAL AND BIOGRAPHICAL

MR. A. G. CONNOLLY has been elected president and general manager of the State Belt Telephone & Telegraph Company, of Nazareth, Pa.

MR. C. L. LANE, who has been secretary of the U. S. Light & Heat Corporation, of Niagara Falls, N. Y., was elected vice-president at a recent meeting of board of directors.

MR. H. V. BOZELL has been appointed assistant professor of electrical engineering in the Sheffield Scientific School of Yale University for the college year 1916-1917, for which period he has secured leave of absence from the University of Oklahoma, where he is dean of the school of electrical engineering and professor of electrical engineering.

MR. CHARLES G. KAHANT has recently joined the sales organization of the Roller-Smith Company in the main office of the company in New York City. Mr. Kahant has specialized in radio work for the past eight years, and was for four years previous to accepting his new position assistant manager of the Atlantic Communication Company, New York City.

MR. W. H. THOMSON has resigned as general manager of the Kansas City (Mo.) Light & Power Company. It is understood that no successor to Mr. Thomson will be appointed, but that the position of general manager is to be abolished and the duties taken over by the president, MR. J. H. LUCAS. Mr. Thomson became general manager of the Kansas City company when it was reorganized last spring. He formerly was manager of the Des Moines (Iowa) Electric Company.

MR. THOMAS W. MARTIN, who was elected president of the Alabama Light and Traction Association at its recent convention, is vice-president and general counsel of the Alabama Power Company. He received his early education at Stark's School in Montgomery, Ala., and completed his academic work at the University of Alabama, where later he also graduated in law. Two years after he was appointed assistant attorney-general for Alabama, serving two terms. In 1912 he became general counsel for the Alabama Power Company and shortly after was elected to the vice-presidency.

MR. N. S. MOORE, asssitant general manager of the Electrical Engineers Equipment Company, Chicago, Ill., will shortly sever his connection with that company to become sales engineer for the Lewis & Roth Company, Philadelphia. Mr. Moore has been connected with the Electrical Engineers Equipment Company for over five years and before that time was with Sargent & Lundy, engineers, Chicago. The Lewis & Roth Company are sales agents and engineers, and handle the products of the Electrical Engineers Equipment Company, Barnes & Lindsley, Morgan Crucible Company, Pittsburgh Transformer Company, Fairbanks Morse & Company, and the John A. Roebling's Sons Company.

MR. WILLIAM L. ABBOTT, chief engineer of the Commonwealth Edison Company, Chicago, Ill., will be the honored guest at a testimonial dinner to be given to him by several hundred alumni of the University of Illinois at the Hotel

W. L. Abbott.

La Salle, Chicago, November 4. Mr. Abbott is president of the board of trustees and the dinner is being tendered as a recognition of his long service on the board, of which he has been a member for 12 years. Mr. Abbott was graduated from the university in the class of 1884. In addition to the many prominent speakers to be present at the dinner, a specially prepared motion-picture film will be presented showing a panorama of present-day life at the university.

MR. E. A. WILCOX, formerly electric-heating specialist with the Great Western Power Company, San Francisco, Cal., has been made manager of the Tulsa

E. A. Wilcox.

property of the Oklahoma Public Service Company, and has taken up his duties in that city. Mr. Wilcox was at one time with the West Penn Railways Company, and later was for several years contract agent of the Great Shoshone & Twin Falls Water Power Company at Twin Falls, Idaho. In this position he developed a large heating load and while there and in San Francisco gave a great deal of attention to this subject. He has lately written a book entitled "Electric Heating." In 1913 Mr. Wilcox was elected Mars in the Jovian Order. He is a member of the American Institute of Electrical Engineers.

OBITUARY.

MR. HENRY SPLITDORF, one of the pioneers in the development of electrical devices, died at his home in New York City, October 16, aged 83 years. He was engaged in the manufacture of the famous Werner von Siemens magneto, used for college laboratory purposes, as early as 1858. The Splitdorf coil for the firing of explosives, the Splitdorf repeating relay for telegraph instruments and the Rhumkorff coils for use in connection with the X-ray were among his inventions. He is survived by Charles F. and John Splitdorf, of the Splitdorf Electrical Company, Newark, N. J.

MR. ARTHUR C. EASTWOOD, president of The Electric Controller & Manufacturing Company, Cleveland, O., and widely known as an electrical engineer and inventor, died October 17, at Battle Creek, Mich. He received his early education in the public schools of Louisville, Ky., and his technical education at the Rose Polytechnic Institute. In 1898 he entered the electrical department of the Homestead Steel Works, and was associated with Mr. A. C. Dinkey in the first extensive applications of electrical power in the manufacture of steel. Later he accepted the position of electrical engineer for Tennessee Coal, Iron & Railway Company, at Ensley, Ala. His work there attracted the attention of S. T. Wellman, and he was persuaded to accept the positions of electrical engineer for the Wellman-Seaver Engineering Company and chief engineer for the newly formed Electric Controller & Supply Company. As a result of Mr. Eastwood's inventive ability, the growth of the latter company was so rapid that he was soon forced to give the business his entire attention under the title of general manager and chief engineer. About 1905 Mr. Eastwood and his associates reorganized the company, and the firm name was changed to The Electric Controller & Manufacturing Company, with Mr. Eastwood as active head of the business. Mr. Eastwood was the patentee of nearly 100 inventions, covering all phases of electrical control and power generation. He took great pride in his development of the lifting magnet. His inventive ability, however, was probably one of the less important factors in his success. His personality was of such a winning nature that he was enabled to build up an organization of devoted and loyal assistants, and his character was strong and fine. Mr. Eastwood was a Fellow of the American Institute of Electrical Engineers, and a member of the Engineers Club of New York, the Union Club and Mayfield Country Club of Cleveland, and numerous other scientific and commercial organizations.

CURRENT ELECTRICAL NEWS

Weekly Record of Construction Activities

EASTERN STATES.

BANGOR, ME.—The Bangor Railway & Electric Company has awarded a contract to W. E. Fish of this city for the construction of a new substation at Corinth, work to be commenced immediately.

VINALHAVEN, ME.—The sale of the Vinalhaven Electric Company was confirmed on October 19, the result of foreclosure by the Boston Safe Deposit & Trust Company, mortgagees.

CONCORD, N. H.—The Public Service Commission recently considered applications of the Penacook Electric Light Company and the Concord Electric Company for the consolidation of the two, and a petition of the Concord Electric Company to provide electric service in Boscawen. A merger of the two companies, which are under the management and control of Charles H. Tenney & Company, Boston, would result in extensions and economies.

BRATTLEBORO, VT.—The Twin States Gas & Electric Company, whose headquarters are now at Dover, N. H., will, about November 15, make its headquarters in this town. Offices will be established in the American Building.

RUTLAND, VT.—The Hortonia Power Company, of this city, plans to extend its transmission lines into the towns of Hinesburg, Monkton and Ferrisburg, which now have no electric service.

MARLBORO, MASS.—A project to build a street railway from Waltham to this city, to be known as the Boston & Western Electric Railway, is being agitated. Committees of the Waltham and Marlboro boards of trade held a conference recently.

AUBURN, N. Y.—The Empire Gas & Electric Company has been authorized by the Public Service Commission to sell bonds in the sum of $61,000, the proceeds to be used for extensions to its generating and distribution systems.

EDEN, N. Y.—The Niagara & Lake Erie Power Company, of Fredonia, has been authorized by the Public Service Commission to furnish electric service here. A transmission line will be erected from either Derby or North Evans to this city.

ITHACA, N. Y.—The Ithaca Gas & Electric Corporation has applied to the Public Service Commission for authority to purchase the holdings of the Homer & Cortland Gas Light Company, the Norwich Gas & Electric Company and the Oneonta Light & Power Company. According to General Manager S. J. Magee, the company plans to make a large number of extensions and improvements throughout the territory covered by the smaller companies and extensions into new territory if the application is approved.

NIAGARA FALLS, N. Y.—The Carborundum Company, it is reported, will build an administration building on the property of the Niagara Falls Power Company near Niagara River. Privilege of the use of its present offices will be extended to the Massachusetts Institute of Technology, which will establish a research laboratory at the Falls.

NORTH TONAWANDA, N. Y.—The Board of Aldermen has entered into negotiations for a street-lighting contract with both the Tonawanda Power Company and the Niagara Light, Heat & Power Company. Both companies will install sample lamps for the inspection of the board.

PORT HENRY, N. Y.—The Port Henry Light, Heat & Power Company has been authorized by the up-state Public Service Commission to issue $75,000 common stock at par and $414,000 five-per-cent first-mortgage bonds at 85. The proceeds will be used as follows: $86,000 for the construction of a hydroelectric plant at Port Henry; $100,000 for the purchase of land and water rights; $58,000 for a high-tension transmission line; $115,000 for the construction of a generating station, and the balance for various minor purposes.

BRIDGETON, N. J.—The International Light, Heat & Power Company, the new corporation which has absorbed the Bridgeton Electric Light Company and other companies in South Jersey, is pushing the work of erecting a high-tension transmission line to connect Bridgeton with Woodstown and Salem.

JERSEY CITY, N. J.—The Newark Avenue Merchants' Association is planning for the installation of a special decorative street-lighting system during the Christmas holidays. Adolph Walters is president of the association.

MERCHANTVILLE, N. J.—The Borough Council has granted the Bell Telephone Company a franchise for the installation of an underground conduit system in streets in the business district.

NEWARK, N. J.—The Public Service Electric Company will make extensions to its generating plant at Point-No-Point.

NEWARK, N. J.—The Common Council has approved specifications for the installation of new electric-lighting fixtures in the city hospital. H. J. and J. V. King, of Newark, are the architects.

DUQUESNE, PA.—A tract of land has been purchased by the Duquesne Light Company for the purpose of erecting an electric power station. The property is situated two miles from Dixmont. It is reported that the company will furnish service to the town of Aliquippa.

FREEMANSBURG, PA.—The holdings of the Freemansburg Electric Light & Power Company have been purchased by the Lehigh Valley Light & Power Company.

HAUTO, PA.—Application has been made to the Public Service Commission by the Lehigh Navigation Electric Company, of this city, for approval of its purchase of the franchises of the Alsace Township, Rockland Township, Ruscomb Manor Township and Little Lehigh Electric companies.

MEDIA, PA.—The Borough Council has let a contract to Louis F. Green, of Media, for an addition to the municipal electric-lighting plant where another generator will be installed.

PHILADELPHIA, PA.—Fred Pearson Company, Inc., will build a new power plant on Wilde Street.

PHILADELPHIA, PA.—The Connecting Railway Company, associated with the Pennsylvania Railroad Company, has issued mortgage bonds to cover the cost of the electrifying of the Chestnut Hill branch of the system, estimated to cost $1,200,000.

POTTSTOWN, PA.—The Philadelphia Suburban Gas & Electric Company will extend its electric system to furnish service to Kenilworth and Cedarville.

ROSSVILLE, PA.—The Dover-Rossville Company has been granted permission to install and operate a trackless trolley system in York County.

SHARON, PA.—The Republic Railway & Light Company will furnish a large amount of additional electric energy to the National Malleable Castings Company in this city, for the operation of electric furnaces. The castings company has just completed the installation of an electric furnace for making high grade steel requiring 1,100 horsepower and one for heating treatment of steel requiring 1,200 horsepower. The installation of these two furnaces doubles the electric steel and heating capacity of the plant and increases the total energy furnished by the Republic Railway & Light Company to the company to 4,800 horsepower. Use of electrical energy in steel making is rapidly increasing, and as a result of the demand in the Youngstown and Sharon districts for electric energy for industrial purposes the large central generating station of the Republic Railway & Light Company at Lowellville, O., is to be largely increased in capacity.

SUNBURY, PA.—The Northumberland County Gas & Electric Company will improve its local electric system and service, in accordance with suggestions of the Public Service Commission.

WILMINGTON, DEL.—Laying of cables for the National Properties Company, connecting its generating plant at Wilmington, and crossing under the Delaware River, to supply power to the company's newly acquired utilities properties in southern New Jersey, has been completed, each having a capacity of 2,000 kilowatts at 11,000 volts. The properties on the New Jersey side of the river are the Pennsgrove & Salem Electric Railway and several lighting companies.

RICHMOND, VA.—Plans are being made for improvements to the municipal electric-lighting plant, at an estimated cost of $35,000.

LYNCHBURG, VA.—The Lynchburg Traction & Light Company has commenced the work of installing the new street-lighting system here. The entire overhead wire system will be reconstructed and 710 arc lamps of the latest type will be installed. This total does not include the viaduct and bridge lighting nor the white-way system with which the business section of Main Street is to be illuminated.

WILLIAMSBURG, VA.—It is reported that the Williamsburg Electric Light & Power Company, which has the local electric franchise, has purchased the property of the Williamsburg Knitting Mills for $33,000 and that the plant will be remodeled and used for a power station.

WINCHESTER, VA.—The Public Service Commission has been upheld in a court decision made on the granting to Northern Virginia Power Company, of this city, the privilege of raising its dam near Millville. It is proposed to increase the head of water from 12 to 21 feet and thereby increase the output of the plant. D. J. Howell, who owns a water-power plant above the dam, sought an injunction to restrain the power company from inereasing the level of its dam.

NORTH CENTRAL STATES.

DAYTON, O.—The Oakwood Street Railway Company has asked the Public Service Commission for authority to issue $10,000 in bonds to be used for improvements.

HAMILTON, O.—Ordinances have been passed by the City Council providing for the expenditure of about $5,700 for the purchase of necessary supplies for the extension and repair of the local electric-lighting system.

YOUNGSTOWN, O.—The City Council has passed an ordinance granting to the Mahoning County Light Company the right to erect and maintain conduit, poles, wires and other electrical apparatus for the purpose of operating an electric-light plant and system and of furnishing electric light and power for consumption in this city.

LAFAYETTE, IND.—An addition to the Monon shops is to be erected for the use of the electrical department, necessitating the installation of considerable equipment. W. H. Fogg is division superintendent.

BERWYN, ILL.—Bids are being received by the City Council for the installation of a street-lighting system estimated to cost $15,000.

EUREKA, ILL.—The Caldwell Engineering Company has submitted plans and specifications for the development of the Rome View drainage and levee district in Woodford County. The plans call for the building of an electrically operated plant with two 30-inch pumps driven by 250-horsepower motors. The total cost of the project is estimated at $338,000.

GIBSON CITY, ILL.—By a vote of 600 to 150, citizens here declared in favor of issuing $29,000 in bonds for building a municipal electric-lighting plant and improving the waterworks system.

ROCKFORD, ILL.—The Rockford Electric Company is planning to reduce its rates for electricity. A boulevard lighting system for the residential district is also under consideration. Adam Gschwindt is manager of the company.

DETROIT, MICH.—The Detroit United Railway is planning improvements to its boiler equipment in one of its power plants, the work to be done early next year. The

changes contemplated are the installation of six Sterling boilers and forced draft stokers, and the building of a large brick stack. Because of the increasing demand for energy the company proposes to contract with the Detroit Edison Company for about 3,500 kilowatts in addition to the present contract for 10,500 kilowatts.

ELK RAPIDS, MICH.—The Common Council has granted a new ten-year franchise to the Elk Electric Company.

GRAND RAPIDS, MICH.—Citizens on East Leonard Street have subscribed $7,500 for a boulevard lighting system, bids for which will be advertised.

PETOSKEY, MICH.—The purchase of new water-wheels and a generating unit for the municipal electric-lighting plant is being considered by city officials.

APPLETON, WIS.—The Wisconsin Traction, Light, Heat & Power Company is planning the erection of a substation near Little Lake Butte des Mortes to supply additional electrical energy in Neenah.

ASHLAND, WIS.—According to a statement of Manager A. C. Donald, the Ashland Light, Power & Street Railway Company will increase the capacity of its power plant here from 3,000 to 10,000 horsepower. An addition will be made to the boiler room and four 600-horsepower boilers will be installed. A new concrete stack will also be erected.

MILWAUKEE, WIS.—Improvements costing $110,000 are planned for the auditorium here. New heating and lighting systems are included in the plans. J. C. Greib is manager.

BROWNTON, MINN.—Plans are being considered here for changing the municipal electric-lighting plant from direct to alternating current and obtaining energy from one of the power companies operating in this section.

BUHL, MINN.—The Village Council has let a contract for an addition to the power house and the installation of boilers to the Rich-Bailey Company at its figure of $31,000.

MANKOTA, MINN.—A transmission line from St. James to Butterfield and one from St. Peter to Cleveland are being erected by the Consumers Power Company. The company will also erect distribution lines radiating from Butterfield and will install a distribution system in Cleveland. R. E. Brown is local manager.

ST. PAUL, MINN.—The City Council has approved plans providing for extension of the ornamental lighting system in several downtown streets.

CENTERVILLE, IOWA.—The Centerville Light & Traction Company is planning the erection of a 33,000-volt, three-phase transmission line from Centerville to Allerton, a distance of 12 miles, the work to be done after the first of the year.

WATERLOO, IOWA.—Bids are being received for electric wiring, fixtures, bells, telephones and clocks to be installed in the new building of the Independent school district of East Waterloo. W. H. Brunn is secretary.

BRUNSWICK, MO. — The Brunswick Light & Water Company has increased its capital stock from $10,000 to $25,000.

ALTOONA, KANS.—The installation of an electric-lighting system and improvements to the water-works system costing in the neighborhood of $22,000 are being considered here. Riley & Hardman, of Parsons, Kans., are the consulting engineers.

BUNKER HILL, KANS. — Ways and means are being considered here to secure an electric street-lighting system.

GENESEO, KANS.—Plans are being discussed for the installation of an electric distribution system here. Energy for the operation of the system probably will be obtained from the United Electric, Water & Gas Company, of Hutchinson, Kans.

BAYARD, NEB.—A franchise has been granted to the Intermountain Electric Light & Power Company, of Lama, Colo., to supply electric service here.

SOUTH CENTRAL STATES.

GEORGETOWN, KY.—The Georgetown Water, Gas, Electric & Power Company has made a statement to voters here in connection with the proposed bond issue up for consideration on November 7. The company proposes that the city and the company shall each name a competent arbitrator who will consider the rates for private lighting and agree on rates which shall be fair, or, failing to agree, that they shall select a competent engineer to assist them. In return the company asks that the present contract with the city be annulled and that a new franchise, embodying the rates agreed upon be sold the company, to extend the agreement for 20 years. A bond issue of $100,000 is proposed to establish a municipal lighting plant and a water system.

LEXINGTON, KY.—The City Commission is considering plans for improvement of the lighting system on Main Street and proposes that wires between Limestone Street and Broadway be placed underground.

LOUISVILLE, KY.—The James Clark, Jr., Electric Company is contemplating the addition of a foundry department to its factory at Shelby and Bergman Streets and is now getting estimates. The company is nearly four months behind on contracts and is receiving a large number of inquiries.

STURGIS, KY.—The Trade Water Milling Company and the Quinn-Jones elevator and warehouse are equipping with electrically driven machinery.

MT. PLEASANT, TENN.—The Mt. Pleasant Electric Light Company has completed the installation of a new street-lighting system.

BESSEMER, ALA.—A contract has been entered into with the Alabama Power Company by which the town of Hueytown will be supplied with energy for an electric-lighting system.

FLORENCE, ALA.—Bids are being received at the office of the city clerk for heating, lighting and pumping equipment for the new high school building to be erected here.

VICKSBURG, MISS. — The Vicksburg Light & Traction Company is planning to install a 15,000-kilowatt turbogenerator and auxiliary equipment.

YAZOO CITY, MISS.—The installation of additional generating equipment at the municipal electric-lighting plant is contemplated. J. S. Butter is superintendent.

COTTER, ARK.—The Town Council has granted a franchise to J. L. Goodrich, of Mountain Home, and others to install an electric-lighting plant here.

BUFFALO, OKLA.—Bonds in the sum of $15,000 have been voted, the proceeds to be used for the construction of an electric-lighting plant.

YALE, OKLA.—It is proposed to issue $25,000 in bonds for the installation of an electric-lighting plant and water-works system, voters to consider the proposition at an early election.

DALLAS, TEX.—It is authoritatively announced that with the settlement of the franchise difficulties in Dallas, involving the street railway and interurban interests, the Southern Traction Company will proceed with the carrying out of its plans for the construction of an extension of its interurban line from Waco south to Austin, a distance of about 100 miles.

HOUSTON, TEX.—The new municipal warehouse which is to be erected here at a cost of about $350,000 will be equipped with an electric conveyor system and a 20-ton electric crane.

LA PRYOR, TEX.—R. L. Couser and W. L. Tittsworth will build an electric-lighting plant here.

THORNTON, TEX.—Ways and means are being considered here for the establishment of an electric-lighting plant.

DATES AHEAD.

American Mining Congress. Hotel La Salle, Chicago, Ill., November 13-18. Secretary, J. F. Callbreath, Denver, Colo.

Southeastern Section, N. E. L. A. Annual convention, Tampa, Fla., November 15-17. Secretary, T. W. Peters, Columbus, Ga.

Electric Power Club. Hot Springs, Va., November 15-18. Secretary, C. H. Roth, 1410 West Adams Street, Chicago, Ill.

Ohio Society of Mechanical, Electrical and Steam Engineers. Annual meeting, Columbus, O., November 16. Secretary, F. E. Sanborn, Ohio State University, Columbus, O.

Kansas Public Service Association. Annual meeting, Topeka, Kans., December 7-8. Secretary, E. A. Wright, Manhattan, Kans.

American Association for the Advancement of Science. Annual meeting, New York City, December 26-30. Permanent secretary, L. O. Howard, Smithsonian Institution, Washington, D. C.

American Institute of Chemical Engineers. Annual convention, New York City, January 10-13, 1917. Secretary, J. C. Olson, Cooper Union, New York, N. Y.

New Mexico Electrical Association. Annual convention, Albuquerque, N. M., February 12-14. Secretary pro tem, E. A. Thiele, Roswell, N. M.

WESTERN STATES.

GREAT FALLS, MONT.—Construction is progressing rapidly on the plant of the Montana Power Company at Rainbow dam, one of the three plants now being operated by the company in Great Falls, and which will increase the output of this plant by 13,000 horsepower. The total capacity of the three plants when the present work is completed will be 158,000 horsepower, less than half that available for future development at this point. Improvements are estimated to cost $500,000.

THREE FORKS, MONT.—The Montana Power Company has been awarded the contract for furnishing energy for the local street-lighting system.

FORT COLLINS, COLO.—The installation of a new street-lighting system in this city was celebrated October 27. The Western Light & Power Company made the installation and furnishes service.

KINGMAN, ARIZ.—The Desert Power & Water Company is making good progress in the construction of its transmission line across the desert to Chloride.

KINGMAN, ARIZ.—The Board of Supervisors has granted a franchise to the Oatman Hydro-Electric Power Company to operate as a public utility in Mohave County, furnishing electric power to the Oatman mining district and neighboring sections.

SALT LAKE CITY, UTAH.—Joel Richards, traffic manager of the Saltair Beach Company, announces that the Saltair Railroad will be electrified and an extension to Garfield completed this winter at a cost of $300,000.

GARDENVILLE, NEV.—L. Ruhenstroth, who purchased the Rodenbah ranch, plans the installation of an electric plant.

CEDARVILLE, WASH. — The Puget Sound Light & Traction Company is considering plans for the extension of its transmission line from Mount Vernon to Cedardale, a distance of three miles, to supply electric service.

SHELTON, WASH.—T. E. Donaldson and W. C. Berger, formerly of the Elma (Wash.) Light & Power Company, have purchased the holdings of the Shelton Light & Power Company.

TACOMA, WASH. — Commissioner of Light and Water James C. Drake has asked for bids for furnishing incandescent lamps to the city, estimated to cost $10,000.

BANNING, CAL.—The Light & Power Utility Company has purchased a site at Ramsey and Second Streets for the purpose of erecting a two-story office and shop building.

DIXON, CAL.—J. J. Smith, director of the Sacramento Valley Electric Road, states that his company is planning the construction of a second unit from Dixon to Woodland.

INDEPENDENCE, CAL.—The Southern Sierras Power Company has filed application for a franchise to erect poles, towers, etc., for transmitting electricity along the public roads of Inyo County.

LOS ANGELES, CAL.—The Board of Harbor Commissioners has asked for bids for installing electric service in Shed No. 152.

LOS ANGELES, CAL.—The Board of Supervisors has asked for bids for the installation of additional street lighting in the Verdugo Lighting District.

LOS ANGELES, CAL.—Plans for extensive ornamental lighting improvements for this city are being fostered by a committee of business men appointed at a meeting last week.

LOS ANGELES, CAL.—The Fontana Power Company has been given permission by the State Railroad Commission to lease its properties to the Southern California Edison Company.

LOS ANGELES, CAL.—The City Council has ordered electrical energy furnished for the lighting of Sixth Street between Palos Verde Street and Pacific Avenue. It also asked for bids for the lighting of Adams Street between Hoover and Figueroa Streets.

OAKLAND, CAL.—Plans are being made for the reconstruction of the plant of the

Judson Iron Works involving an expenditure of about $100,000. Part of the contemplated improvements includes the complete electrification of the mills, supplanting steam. H. W. Gallett is secretary of the company.

OCEANSIDE, CAL.—The city has called for bids for the contract to light the streets for a period of five years, the individual or corporation to whom the contract is let to furnish, install and maintain all equipment.

OROVILLE, CAL.—The United States Exploration Company plans to install a hydroelectric plant at its mine in Plumas County.

SACRAMENTO, CAL.—Frank M. Ish, of Oakland, has applied to the State Water Commission for permission to use all the unappropriated water with a minimum of 100 second-feet, of the waters of the South Fork of the Merced River in Mariposa County, for the generation of electric power. The cost of the work is estimated to be $1,500,000, and will be commenced in June, 1917.

SAN BERNARDINO, CAL.—J. G. VanZandt, of Forest Home, has applied to the State Water Commission for permission to use waters of Mill Creek to the amount of 25 cubic feet per second for the purpose of generating power for manufacturing purposes.

SAN FRANCISCO, CAL.—The Northern California Power Company has taken an option for five years on the Weaverville Electric Company's plant in Trinity County. It is planned to extend a line to Weaverville and possibly to Junction City, where connection will be made with the lines of the Western States Power Company that serve Eureka. The company has just completed an extension from the substation at Washington Mine, near French Gulch, to Lewiston.

Proposals

CABLE.—Sealed proposals will be received at the office of the Chief Signal Officer, War Department, Washington, D. C., until November 3, for furnishing 1,600 feet of cable. Specifications may be obtained on application to the above-named office. (Refer to Proposal No. 877.)

POWER PLANT CONSTRUCTION.—Bids will be received until December 1 by the city of St. Cloud, Fla., F. B. Kenney, city clerk, for the construction of a power plant and furnishing boilers, water purifiers, feed-water heaters, switchboard, transformers, meters, etc.

SIGNAL CORPS SUPPLIES.—Sealed proposals will be received at the office of the Chief Signal Officer, War Department, Washington, D. C., until November 9, for furnishing bells, controllers, lamps, switches, etc. Drawings and specifications may be obtained on application to the above-named office. (Refer to Proposal No. 876.)

ELECTRICAL ELEVATORS. — Sealed proposals will be received at the Supervising Architect's Office, Treasury Department, Washington, D. C., until November 15, for the installation complete of an electric passenger elevator in each of the following buildings: Post office at Elkins, W. Va., post office and customhouse at Newport, R. I., and the post office and courthouse at Tuscaloosa, Ala.

ELECTRIC CLOCK SYSTEM. — Sealed proposals will be opened in the office of the Supervising Architect, Washington, D. C., November 20, for an automatic electric clock system in the building, Interior Department Offices, Washington, D. C., in accordance with drawings and specifications, copies of which may be had at that office in the discretion of the Supervising Architect. James A. Wetmore, Acting Supervising Architect.

ELECTRICAL SUPPLIES.—Bids will be received at the Bureau of Supplies and Accounts, United States Navy Department, Washington, D. C., for furnishing supplies at the following naval stations: Schedule 325, Brooklyn, N. Y., and Mare Island, Cal., eight five-horspower turning-gear motors. Schedule 330, Brooklyn, N. Y., 5,000 feet of armored controller cable, 2,900 feet of telephone cable, 20,000 feet of twin lamp cord, 100,000 feet of telephone cord, and 565,000 feet of double-conductor cable. Schedule 330, Boston, Mass., 9,000 tubular-wire copper connectors, and 650,000 feet of silicon bronze antenna wire. Bidders desiring to submit proposals should make application immediately for schedules to the Bureau, or to the purchasing office nearest to navy yard where delivery is to be made.

Foreign Trade Opportunities

[Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its offices at Boston, New York, Atlanta, Chicago, St. Louis, New Orleans, Seattle and San Francisco. Write on separate sheet for each item and give file number.]

NO. 22,685. ELECTRICAL SUPPLIES.—The Bureau is informed that a firm in Norway desires to enter into commercial relations with American manufacturers of all kinds of electric lamps and electrical appliances. Reference is given.

The annual fair at Lyons, France, will be held from March 1 to 15, 1917. Buyers from all parts of the world will be present, and it is desirable to have a large representation of American manufactures. The United States Department of State has placed $500 at the disposal of the American consul, which will enable him to distribute the catalogs and other literature of American manufacturers who are interested. Catalogs may be forwarded direct to the consul at Lyons.

NO. 22,812. ELECTRICAL FITTINGS.—An import house in the Far East desires to be placed in touch with American manufacturers and exporters of electric-light fittings for dwellings, such as china clay fittings, brass articles, switches, cutouts, holders, shades, table and ceiling fans, etc. Full information as to prices, discounts, etc., is desired. References.

NO. 22,817. ELECTRIC-WIRE MACHINERY.—A manufacturer of wire goods in Spain asks for the names of several manufacturers of machines for making electric wire.

NO. 22,825. ELECTRICAL SUPPLIES.—A firm in Brazil desires to be placed in communication with manufacturers and exporters of electrical supplies, machinery and installations, metal pipes and fittings, rods, bars, and sheets.

New Incorporations

ROSEDALE, W. VA.—Raven Carbon Company. Capital, $200,000. To manufacture carbon.

CLEVELAND, O.—R. & H. Manufacturing Company. Capital, $10,000. Electrical supplies. Incorporators: F. K. Henderson, J. G. Raquette and others.

DES MOINES, IOWA.—The Des Moines Bright Light Company. Capital, $10,000. Deal in electrical supplies. Incorporators: G. E. Russell, J. L. Anker and B. McPhee.

NEW YORK, N. Y.—Northern Ohio Electric Corporation. Capital, $6,375,000. Incorporators: George E. Hardy, John C. Weadock and Jacob Hekma, all of 14 Wall Street.

BRONX, N. Y.—North Side Battery & Electric Company. Capital, $10,000. Electric service station. Incorporators: J. F., J. A. and L. M. Hanudel, all of 21 Lawrence Street, Flushing, N. Y.

DOVER, DEL.—The Detroit Battery Company. Capital, $500,000. Manufacture storage batteries and electrical appliances. Incorporators: W. F. O'Keefe, G. G. Stigler and E. E. Wright, Wilmington, Del.

DOVER, DEL.—Thomas K. Bell Engineers, Inc. Capital, $200,000. Engage in electrical and mechanical work. Incorporators: F. R. Hansell, Philadelphia, Pa.; George H. B. Martin and S. C. Seymour, Camden, N. J.

NEW YORK, N. Y.—C. D. Babcock Company. Capital, $10,000. Manufacture electrical machinery and apparatus of all kinds. Incorporators: John Neilson, Larchmont, N. Y.; Clifford D. Babcock, 19 East Fifteenth Street, New York City, and C. W. Fairbank, Pelham Manor, N. Y.

CONCORD, N. H.—The New England Cable Company. Capital, $50,000. Deal in wire and cables for automobiles, and electric power transmission. Incorporators: Samuel Dunsford, Josiah E. Fernald, Fred N. Ladd and Harry J. Brown, of Concord, and D. J. MacDougall, of Lowell, Mass.

WILMINGTON, DEL. — Great Eastern Power Company. Capital, $200,000. To engage in the business of mechanical engineers and in the manufacture and sale of motors, engines and other electrical and engineering apparatus. Incorporators: Clement M. Egner, Elkton, Md.; Norman P. Coffin and Herbert E. Latter, Wilmington, Del.

Financial Notes

The Public Service Corporation, Newark, N. J., has issued a statement showing an increase in total business during September, 1916, of $423,477.47, or 13.2 per cent, over the corresponding month of last year. For the nine months of the year ending September 30, the gross increase in total business over the same period of 1915 was $3,630,253.84, or 13.3 per cent, providing a surplus available for dividends amounting to $888,504.42.

William A. Read & Company, New York City, have purchased from the Brazilian Traction, Light & Power Company, $7,500,000 three-year six-per-cent secured gold notes, dated November 1, 1916. This is the first foreign corporation financing, outside of some for Canada, that has been done in this market. Brazilian Traction stock is largely owned in Belgium, France, England and Canada and the company's financing heretofore has always been done in London.

In the first eight months of its present fiscal year ending December 31. Adirondack Electric Power Corporation earned $237,663 after all charges, or at the annual rate of 14.24 per cent on 25,000 preferred shares. Income in August and September was comparatively lean, owing to drought, but less power was required during the past month by reason of the Albany street car strike. In view of all the circumstances, it is probable that directors will not inaugurate preferred dividends before they become six per cent cumulative with the first quarter of 1917.

A public hearing is being held this week by the New York Public Service Commission on a joint petition of the Kings County Electric Light & Power Company and the Edison Electric Illuminating Company of Brooklyn for an order authorizing the Kings County company to issue $2,500,000 in convertible debentures, and the Edison company to issue its demand notes for $1,337,229.40. This application is a renewal of an application for part of a $5,000,000 issue applied for in December, 1909, under which the Commission, in January, 1910, approved the issue of $2,500,000.

Directors of the Electric Bond & Share Company, controlled by the General Electric Company, have declared an extra dividend of $1,000,000 on the common stock of the company. The directors have also authorized the issuance of $2,000,000 additional preferred stock and $2,000,000 additional common stock. The preferred stock is to be offered for subscription at par and accrued dividends to holders of preferred stock of record at the close of business October 21, in the proportion of one share of new stock for each three shares of preferred stock held.

CLOSING BID PRICES FOR ELECTRICAL SECURITIES IN THE LEADING EXCHANGES AS COMPARED WITH THE PREVIOUS WEEK.

	Oct. 30	Oct. 23
American Telephone & Telegraph (New York)	133⅛	132⅞
Commonwealth Edison (Chicago)	145	145
Edison Electric Illuminating (Boston)	230	234½
Electric Storage Battery, common (Philadelphia)	69	69½
Electric Storage Battery, preferred (Philadelphia)	69	69½
General Electric (New York)	181¼	184½
Kings County Electric (New York)	129	130
Massachusetts Electric, common (Boston)	4¼	5
Massachusetts Electric, preferred stamped (Boston)	32	34
National Carbon, common (Chicago)	268	264
National Carbon, preferred (Chicago)	.....	.....
New England Telephone (Boston)	128	129¾
Philadelphia Electric (Philadelphia)	29⅜	29¾
Postal Telegraph-Cables, common (New York)	36⅜	36¼
Postal Telegraph-Cables, preferred (New York)	66½	66½
Western Union (New York)	102½	103½
Westinghouse, common (New York)	63¾	63¾
Westinghouse, preferred (New York)	70	70

The following directors have been elected to office at a meeting of the United Gas & Electric Corporation, Pennsylvania: W. W. Griest, T. C. Detwiler, John C. Carter, P. E. Slaymaker, John Hertzler, J. Fred Sener, John M. Groff and J. W. P. Bausman, Lancaster: R. E. Griscom, John S. Jenks, Jr., Philadelphia; H. C. Schock, Mount Joy; E. G. Connette and George Bullock, New York; and David A. Howe, Williamsport. The new directors will organize in December. The company operates the following properties: Edison Electric Light Company, Conestoga; Conestoga Traction Company; Lancaster Gas Light & Fuel Company, Lancaster; and Columbia Gas Company.

Dividends.

	Term	Rate	Payable
Am. Pub. Util., pf.	Q	1.75%	Nov. 10
Conn. Ry. & Lt., com.	Q	1 %	Nov. 15
Conn. Ry. & Lt., pf.	Q	1 %	Oct. 31
Electric Bond & Share	Ex.	16⅔%	Nov. 15
Illinois Trac., com.	Q	0.75%	Nov. 15
Kaministiquia Pw., pf.	Q	1.75%	Nov. 15
Mass. Con. Ry., pf.	Q	1.375%	Nov. 1
Middle West Util., pf.	Q	1.5 %	Dec. 1
Mobile Elec., pf.	Q	1.75%	Nov. 15
Mon. Val. Trac., pf.	Q	1.25%	Nov. 1
National Carbon	Q	2 %	Jan. 15
National Carbon	Ex.	2 %	Jan. 15
So. Cal. Edison	Q	1.75%	Nov. 15
Union St. Ry., N. Bedford	Q	2 %	Nov. 1

Reports of Earnings.

VIRGINIA RAILWAY & POWER.

The Virginia Railway & Power Company (and leased and operated companies) has issued its pamphlet report for the year ended June 30, 1916. The income account compares as follows:

	1916	1915
Gross earnings	$5,645,158	$5,109,622
Operating expense	2,676,179	2,469,074
Operating income	2,968,979	2,640,548
Other income	96,610	80,919
Total income	3,065,589	2,721,467
Taxes and licenses	327,631	298,551
Net	2,737,958	2,422,916
Interest, rents, etc.	1,415,036	1,337,867
Other charges	168,803	162,545
Surplus after charges	*1,154,117	922,503
Preferred dividends	472,752	472,752
Common dividends	358,482	358,482
Balance	322,833	91,268

*Equal to 4.79 per cent on $14,200,500 common stock against 3.16 per cent previous year, after charging out preferred dividend.

NORTHERN OHIO TRACTION & LIGHT.

	1916	1915
August gross	$ 473,343	$ 360,054
Net after taxes	134,135	92,177
Surplus after dividend	111,135	75,797
Eight months' gross	3,334,077	2,488,442
Net after taxes	919,505	538,945
Surplus after dividend	741,801	408,263

COLUMBIA GAS & ELECTRIC.

	1916	1915
September gross	$ 606,751	$ 540,312
Net after taxes	269,645	252,505
Total income	321,263	299,094
Deficit after charges	24,259	36,064
Nine months' gross	6,506,647	5,889,722
Net after taxes	3,282,014	2,914,588
Total income	3,681,483	3,287,603
Leases and rentals	2,552,991	2,520,228
Fixed charges, Columbia Gas & Electric Co.	520,526	518,451
Surplus	607,965	248,923

PHILADELPHIA COMPANY.

Philadelphia Company reported earnings of its electric light and power departments for September and the six months ended September 30, as follows:

	1916	1915
September gross	$ 538,323	$ 427,903
Net after taxes	226,844	198,561
Six months' gross	3,165,826	2,522,050
Net after taxes	1,390,130	1,196,224

MONTANA POWER.

	1916	1915
September quarter, gross	$1,507,967	$1,082,319
Net after taxes	1,141,294	784,624
Surplus after charges	825,031	487,350
Nine months' gross	4,411,721	2,992,526
Net after taxes	3,357,795	2,129,819
Surplus after charges	2,376,636	1,276,628

CITIES SERVICE COMPANY.

	1916	1915
September gross	$ 722,055	$ 349,456
Net after expenses	700,524	335,155
Surplus after charges	700,183	294,321
Balance after preferred dividends	502,733	163,488
Nine months' gross	6,088,224	3,045,477
Net after expenses	5,908,865	2,920,269
Surplus after charges	5,653,196	2,552,770
Balance after preferred dividends	4,065,703	1,365,272
Twelve months' gross	7,522,547	4,121,622
Net after expenses	7,295,880	3,962,051
Surplus after charges	6,915,371	3,472,051
Balance after preferred dividends	*4,938,368	1,890,055
Balance after common dividends	4,636,352	1,890,055

*Equivalent to 27.82 per cent on the common stock as compared with 12.84 per cent for the twelve months ended September 30, 1915.

COMMONWEALTH POWER, RAILWAY & LIGHT.

	1916	Per cent Gain over 1915
September gross	$ 1,434,201	15.09
Net	709,559	12.97
Surplus after charges	213,849	19.93
Balance after preferred dividends	125,964	28.13
Nine months' gross	12,260,282	16.65
Net	6,295,429	16.30
Surplus after charges	1,855,391	22.13
Balance after preferred dividends	1,102,356	37.93
Twelve months' gross	16,340,522	14.89
Net	8,507,831	14.99
Surplus after charges	2,631,760	18.41
Balance after preferred dividends	*1,638,725	29.79

*Equivalent to 8.87 per cent on the common stock.

WISCONSIN EDISON, INC.
(North American Co. subsidiary)

	1916	Per cent gain over 1915
September gross	$ 847,352	16.79
Expenses and taxes	531,747	17.27
Net	315,605	16.
Balance available for depreciation and Wisconsin Edison, Inc.	179,330	32.04
Twelve months' gross	9,829,832	15.90
Expenses and taxes	5,814,375	14.83
Net	4,015,457	17.50
Balance available for depreciation and Wisconsin Edison, Inc.	2,400,728	34.63

The appropriation for depreciation of subsidiaries for the twelve months was $1,045,771, an increase of 20.02 per cent over the preceding year, and after deducting interest, taxes, and other expenses of Wisconsin Edison, Inc., the balance for the twelve months ended September 30, 1916, was equivalent to $4.33 a share on its stock, compared with $2.54 a share for the twelve months ended September 30, 1915.

DETROIT EDISON.

	1916	1915
September gross	$ 781,994	$ 601,630
Net after taxes	268,402	208,983
Surplus after charges	180,860	110,367
Nine months' gross	7,056,249	5,427,526
	1916	1915
Net after taxes	2,581,034	1,957,297
Surplus after charges	1,774,127	1,156,664

AMERICAN POWER & LIGHT.
(Combined Earnings of Subsidiaries.)

	1916	1915
September gross	$ 724,019	$ 646,635
Net after taxes	363,515	303,164
Twelve months' gross	8,254,180	7,707,073
Net after taxes	3,846,905	3,522,065

New Publications

HOLLAND REPORT.—The annual report of the Board of Public Works of the City of Holland, Mich., for the year ended March 15, 1916, is largely devoted to the electric lighting department and gives full particulars of operating factors, receipts and expenses.

SILVER VOLTAMETER.—Scientific Paper No. 285 of the Bureau of Standards is entitled "Summary of Experiments on the Silver Voltameter at the Bureau of Standards and Proposed Specifications," by E. B. Rosa and G. W. Vinal. A bibliography of the subject is included, and specifications given for work of the highest precision.

CABLE CAPACITY.—The Electro-Technical Laboratory, Tokio, Japan, has issued "Carrying Capacity of Underground Power Cables," by H. Matsumoto. This paper develops the theory and applies it to experimental data. There are 156 pages of text and tables, to which a large number of curves are appended. Definite factors are obtained from determining carrying capacity.

MINIMUM CHARGE.—The American Gas Institute, 29 West Thirty-ninth Street, New York, N. Y., has reprinted a booklet by Samuel S. Wyer entitled "Reasonableness and Legal Right of the Minimum Charge in Public Utility Services" and will furnish copies for One Dollar each, or less in quantities. This booklet of 82 pages contains a compilation of cases where such a charge has been authorized, a justification of its use, and a citation of precedents for making it proportional to the size of the consumer's demand.

MERCURY IN MAGNETIC FIELD.—Scientific Paper No. 289 of the Bureau of Standards is entitled "The Damping of Waves and Other Disturbances in Mercury." It is sometimes of great importance that mercury be prevented from freely vibrating under the actions of a disturbing force, and this is especially true when the mercury is used in accurate scientific instruments such as mercurial barometers. It was found that disturbances in mercury are practically eliminated if it is subjected to a strong magnetic field, as by placing it in certain positions beween the poles of a strong magnet. This method may be used when it is desired to obtain accurate adjustments of mercury surfaces at sea and in other places subject to vibration.

Electrical Patents Issued October 24, 1916

Prepared by Thomas Howe, Patent Attorney, 2 Rector Street, New York, N. Y.

1,202,020. **Battery Connection.** C. E. Berkey, Cleveland, O., assignor to National Carbon Co. Electrode cap.

1,202,037. **Combination-Switch.** A. J. Donnellon, Cincinnati, O. Operated from knob and dial-like combination lock.

1,202,056. **Bulb Support for Electric Lamps.** C. E. Godley, assignor to Edmunds & Jones Corp., New York, N. Y. Telescoping coupling for use in headlights, etc.

1,202,058. **Lamp.** C. E. Godley, assignor to Edmunds & Jones Corp. Headlight with adjustable reflector.

1,202,071. **Lock for Electric Switches.** F. H. Keith, Joliet, Ill. Key-locking attachment for winged-switch mechanism. (See cut on next page.)

1,202,078. **Cell Tester.** J. O. Luthy, San Antonio, Tex. Portable current indicator that may be operated in any position.

1,202,091 and 1,202,092. **Panelboard.** R. H. Olley, assignor to George Cutter Co., South Bend, Ind. Special arrangements of conductors and terminals.

1,202,097. **Device for Testing Rail-Bonds.** E. L. Pollard, Dobbs Ferry, N. Y. Instruments, connecting clamps, etc., on carriage running on rail.

1,202,127. **Ignition System.** C. Upton, assignor to Splitdorf Electrical Co., Newark, N. J. Detailed arrangement of magneto, vibrator, etc., with circuits therefor.

1,202,128. **Ignition Device.** H. R. Van Deventer, assignor to Splitdorf Electrical Co., Newark, N. J. Generator and igniter actuated by engine piston.

1,202,129. **Gate-Operating Mechanism.** G. B. Varnum, Los Angeles, Cal. Electrically controlled; for entrance gates at railway stations, etc.

1,202,136. **Process of Renewing Filaments in Lamps.** A. A. Wilkins, assignor of one-half to C. E. Campbell and F. R. Campbell, Lynn, Mass. Bulb is separated, the filament treated and the bulb parts sealed together.

1,202,149. **Electrolysis of Tin and Its Salts.** A. E. Battle, Aldgate, London, England. Tin is deposited from an electrolyte containing orthophosphoric acid and a tin salt.

1,202,161. **Compression Rheostat.** E. L. Clark, Lakewood, O., assignor to National Carbon Co. Structural details.

1,202,168. **Electromagnetic Wave Receiving System.** E. B. Dallin, Arlington, Mass. Receiving conductor and tuned receiving

circuit are inductively connected by an open circuit.

1,202,179. Morse Transmitting Key. J. J. Ghegan, East Orange, N. J. Structural details.

1,202,186. Signal. C. O. Harrington, assignor to Union Switch & Signal Co., Swissvale, Pa. A lamp giving indication at night and in daylight has its intensity automatically varied.

1,202,202. Visible Alarm for Automobiles. J. H. Millsaps, Washington, D. C. Unauthorized starting of vehicle displays signals.

1,202,210. Gas-Engine Governor. P. Okey, assignor to W. H. Lalley, Detroit, Mich. Throttle electrically controlled according to voltage of driven generator.

1,202,233. Trolley Harp. R. C. Showalter, assignor of one-third to J. P. Reilly and one-third to F. K. Thieme, Altoona, Pa. Manner of securing to pole.

1,202,266. Vehicle-Control System. J. C. Cade, Arcola, N. J., assignor to Federal Signal Co. Manner of operating and controlling a passenger alarm.

1,202,275. Register Controller. A. H. Dyson, assignor to Western Electric Co. Details of device operated by electromagnets.

1,202,281. Machine-Switching Telephone-Exchange System. C. L. Goodrum, assignor to Western Electric Co. Details of contact, side switch, operating magnets, etc., of automatic selector switch.

1,202,306. Station Indicator. J. E. Olvis, Philadelphia, Pa. Gearing of motor-driven curtain roller device for street cars.

1,202,312. Sound-Reproducing Machine. J. T. Prout, New York, N. Y. Phonograph repeater has sound arm magnetically raised.

1,202,316. Spaced Metallic Panel Construction. F. A. Ries, assignor to Hale & Kilburn Co., Philadelphia, Pa. Panels are electrically welded to securing spuds.

1,202,362. Thermoelectric Relay. T. E. Clark, Detroit, Mich. Special structure having contacts controlled by a tensioned current-carrying filament.

1,202,367. Reverting Busy Test for Telephone Systems. H. D. Currier, assignor to Kellogg Switchboard & Supply Co., Chicago, Ill. Arrangement of relays, etc., in connection with operator's link circuits.

1,202,381. Socket Switch for Electric Lamps. C. J. Gustafson, assignor to Hendee Mfg. Co., Springfield, Mass. Manner of securing to plug terminal to prevent withdrawal.

1,202,392. Electromagnet. J. W. Jepson, assignor to Gould Coupler Co., New York, N. Y. Has means for compensating for effects of change in temperature.

1,202,418. Insulator Support. C. L. Pierce, assignor of one-half to Hubbard & Co., Pittsburgh, Pa. Integral metal pin.

1,202,419. Insulator-Supporting Pin. C. L. Pierce, assignor of one-half to Hubbard & Co., Pittsburgh, Pa. Pressed up from a single piece of sheet metal.

1,202,432. Device for Placing and Removing Electric-Light Bulbs. M. W. Rozelle and G. F. Birmingham, Kansas City, Mo. Grip for mounting on pole end with operating means.

1,202,446. Electromagnetic Device. J. B. Speed, assignor to Western Electric Co., New York, N. Y. Arrangement of magnets for giving to bell clappers and the like operated by alternating currents, a vigorous snap action.

1,202,455. Egg Tester. R. A. Turlington, Wilson, N. C. Details of lamp arrangement and light passages.

1,202,457. Acidproof and Electrolytic Tank. R. T. Wales, Sewaren, N. J. Structure of walls.

1,202,478. Service Switch and Wiring for Electric Meters. A. W. Bull, Baltimore, Md. Has terminals and fuses concealed in chamber to prevent tampering.

1,202,498. Illuminated Blank-Book. W. F. X. Findley, Chicago, Ill. Has battery and lamp mounted on back.

1,202,509. Electric Heater. G. A. Burroughs, W. Grant and A. P. Kutshaw, Sudbury, Ontario, Canada. Coil heater for water.

1,202,527. Motor for Steam-Radiator Valves. L. P. Hynes, assignor to Railway Utility Co., Chicago, Ill. Operating electromagnet is mounted on valve.

1,202,532. Tester for Spark-Plugs and Ignition Apparatus. J. M. Keller, Nappanee, Ind. Device for supporting and passing intermittent current through spark plugs.

1,202,534 and 1,202,535. Production of Metallic Tungsten. F. G. Keyes and R. B. Brownlee, assignors to Cooper Hewitt Electric Co., Hoboken, N. J. First patent: Electrolytic process of producing pure tungsten from its oxid. Second patent: Electrolyzing bath has anode consisting of sintered mixture of tungsten powder and low tungsten oxids.

1,202,537. Reversing Gear for Internal-Combustion Engines. J. Kyllainen, Helsinki, Finland. Comprises special arrangement of contacts and ignition shaft.

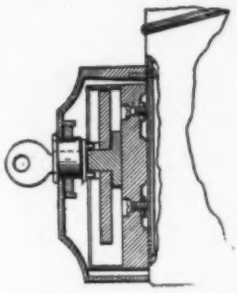
1,202,538. Rerolling, Replaying, and Stopping Mechanism for Musical Instruments. H. J. LaJoie, assignor to Autoplane Co., New York, N. Y. Tracker bar has openings controlled by note sheet for controlling the operating motor.

1,202,555. Code-Ringing Telephone System. T. G. Martin, assignor to Automatic Electric Co., Chicago, Ill. For party lines.

1,202,577. Circuit-Closing Valve for Internal-Combustion Engines. R. J. Peschman, Fort Sheridan, Ill. Structural details.

1,202,593. Advertising Device. G. M. Scott, London, England. Arrangement of mirrors, etc., in multiple-image device.

1,202,622. Automatic Electric Generating System. A Van Horn, Philadelphia, Pa.



No. 1,202,071.—Lock for Electric Switches.

Automatic electric generation and storage system.

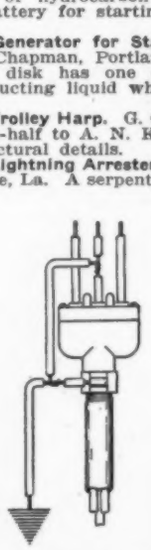
1,202,624. Starting and Ignition Apparatus and System. R. Varley, Englewood, N. J. Special gearing, etc.

1,202,632. Electric Current Generating Plant. E. R. Witzel, Des Moines, Iowa. Combination of hydrocarbon engine, dynamo and battery for starting and lighting.

1,202,672. Generator for Static Electricity. W. H. Chapman, Portland, Me. Rotating glass disk has one edge passing through conducting liquid which does not adhere to it.

1,202,708. Trolley Harp. G. C. Hamel, assignor of one-half to A. N. Kaley, Massillon, O. Structural details.

1,202,714. Lightning Arrester. D. J. Hendren, Burnside, La. A serpentine conductor



Reissue No. 14,207.—Grounding Device.

having enlarged ends with points is mounted in a serpentine slot in a grounded plate and spaced therefrom.

1,202,745. Adjustable Lamp-Support. J. W. Lindner, Post Falls, Idaho. Rotatable and extensible arm.

1,202,752. Electric Generator. F. Newton, Luton, England. Armature flux of exciter is difference of fluxes in saturated and unsaturated field circuits.

1,202,753. Projection Apparatus. W. L. Patterson, assignor to Bausch & Lomb Optical Co., Rochester, N. Y. Arrangement of lamp house, cooling chamber and lenses.

1,202,754. Apparatus for the Projection of Images of Large Opaque Objects. W. L. Patterson, assignor to Bausch & Lomb Optical Co. Arrangement of lamps, dark chamber, lenses, etc.

1,202,756. Telephone. F. Troisi, Pittsburgh, Pa. Has bell in pedestal base of desk instrument.

1,202,757. Alarm Gage. E. M. Barnes, assignor to Kalamazoo Utilities Co., Kalamazoo, Mich. Low-water alarm; contacts controlled by float.

Reissue 14,207. Grounding Device. H. E. Schimmel, Providence, R. I. Original No. 1,088,101, dated Feb. 24, 1914. Conduit and head carrying neutral and current wires with neutral and conduit grounded. (See cut.)

PATENTS EXPIRED.

The following United States electrical patents expired on October 31, 1916:

635,739. Armature for Dynamo-electric machines. S. Bergmann, New York, N. Y.

635,740. Electric Arc Lamp. S. Bergmann, New York, N. Y.

635,750. Dynamo-Driving Mechanism. J. L. Creveling, New York, N. Y.

735,765. Electric Signal. H. T. Gibbs, Portsmouth, R. I.

735,774. Storage Battery. A. Heinemann and W. Schafer, Berlin, Germany.

635,786. Means for Regulating Constant-Potential Transformers. W. A. Layman and F. Schwedtmann, St. Louis, Mo.

635,812. Telephone Transmitter Arm. L. Schmidt, New York, N. Y.

635,815. System and Apparatus for Controlling Electric Vehicles. E. A. Sperry, Cleveland, O.

635,816. System and Apparatus for Controlling Vehicles. E. A. Sperry.

635,819. Electric Arc Lamp. H. O. Swoboda, New York, N. Y.

635,820. Telegraphic Block-Signal System. W. C. Tabor, North Collins, N. Y.

635,851. Electric Arc Lamp. C. E. Harthan, Lynn, Mass.

635,852. Coin-Controlled Telephone-Call Apparatus. G. B. Heath, San Francisco, Cal.

635,862. Electric Arc Lamp. E. S. Lee, Elwood, Ind.

635,880. Summation Meter. E. Thomson, Swampscott, Mass.

635,881. Electric Meter. E. Thomson, Swampscott, Mass.

635,910. Electrical Instrument. W. S. Boult, London, England.

635,930. Electric Cigar-Lighter. F. H. Harriman, Hartford, Conn.

635,938. Means for Cleaning Hulls of Vessels. D. Mason, New York, N. Y.

635,939. Means for Repairing Vessels While Afloat. D. Mason, New York, N. Y.

635,941. Safety Attachment for Propelled Vehicles. J. P. Muller, New York, N. Y.

635,944. Combined Telephone and Push-Button. B. F. Smith, Bay City, Mich.

635,960. Conductor and Cable Terminal. H. G. Grush, Boston, Mass.

636,021. Device for Operating Electrically Illuminated Signs. W. T. Bell, Nottingham, England.

636,023. System of Control of Electric Motors. J. R. Cravath, Chicago, Ill.

636,028. Electric System for Automatically Governing Polyphase Circuit-Breakers. A. H. Engstrom, Philadelphia, Pa.

636,029. Automatic Circuit-Breaking Device for Polyphase Currents. A. H. Engstrom, Philadelphia, Pa.

636,030. Circuit-Breaker. A. H. Engstrom, Philadelphia, Pa.

636,056 and 636,057. Electric-Lighting Gas Burner. R. C. Nourse, Boston, Mass.

636,069. Electric Bell. D. Rousseau, New York, N. Y.

636,081. Lightning Rod. H. J. Stuart and D. D. Woodman, Swain, N. Y.

636,087. Electric Motor for Fans. G. A. Tower, Richmond, Va.

636,089. Burglar Alarm. D. L. Wartzenluft, Kutztown, Pa.

636,090. Air Heater. E. R. Waterman and R. R. Morison, San Francisco, Cal.

636,091. Fluid-Heating Apparatus. E. R. Waterman and R. R. Morison, San Francisco, Cal.

636,093. Electromedical Apparatus. M. L. Whitfield, Memphis, Tenn.

636,097. Electrical Measuring Instrument. V. Arcioni, Ivrea, Italy.

636,116. Automatic Relay. F. E. Chapman, Medford, Mass.

636,134. Telephone-Call Register. W. Gray, Hartford, Conn.

636,135. Coin Holder for Telephone Pay Stations. W. Gray, Hartford, Conn.

636,139. Fire-Alarm Signal Circuit. W. R. Hewitt, San Francisco, Cal.

636,142. Secondary Battery. A. E. Hodgson, Halifax, England.

636,182. Electrical Measuring Instrument. F. W. Roller, New York, N. Y.

636,189. Trolley Pole. S. Vernoy, Toronto, Canada.

636,203. Electric Resistance. H. Heiberger, Thalkirchen, Germany.

636,209. Telephonograph. J. E. O. Kumberg, London, England.

636,212. Electro-Depositing Cell. M. Perreur-Lloyd, London, England.

636,229. Means for Placing, Removing and Cleaning Electric Lamps. E. E. Simms, Albert Lea, Minn.

Reissue, 11,780. Electrically Propelled Vehicle. L. Krieger, Paris, France.